

THE EFFECT OF ENVIRONMENTAL DESIGN AND SENSORY STIMULATION  
ON PEOPLE WITH ALZHEIMER'S DISEASE:  
AN EXPLORATORY STUDY OF THE FAMILY VISIT PROGRAM

A Thesis

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by

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## ABSTRACT

Alzheimer's disease is a progressive and fatal brain disorder that causes cognitive decline and eventual loss of the ability to interact and communicate with others. Family involvement and interaction have been shown to have many therapeutic benefits for people with Alzheimer's disease. However, the decline in cognitive ability and communication skills makes it particularly challenging for family members to have fulfilling and engaging visits. The Family Visit Program (FVP) aims to study the effect of the physical environment and sensory stimulation on the quality of visits using four treatments: existing furniture onsite, a conversation booth, a photo album, and a digital picture frame and stand. The conversation booth was designed as an ergonomic seating unit that helps focus attention by reducing visual and acoustic distractions. The digital picture frame and book-style photo album are intended to serve as the display mediums for the source of stimulation, personally meaningful photographs. The use of existing furniture in the setting is to compare the impact the design intervention has on the quality of interaction.

The research was conducted at Beechtree Care Center, a nursing and rehabilitation facility in Ithaca, NY. The study includes three groups of participants: residents, family members, and staff. Original data are collected and analyzed from video recordings, interviews with all participants, and researcher field notes. The goal is to contribute understanding of how to design an environment and therapeutic sensory intervention that facilitates communication with family members and supports the physical and cognitive needs of people with Alzheimer's disease.

## **BIOGRAPHICAL SKETCH**

Hannah Mi Kim attended Cornell University for her undergraduate education, studying interior design and gerontology. She earned a Bachelor of Science in the field of Design and Environmental Analysis in May 2009. Prior to Cornell, Hannah attended DuPont Manual High School in Louisville, KY where she majored in Math, Science, and Technology with a minor in Visual Arts.



Dedicated to my parents for their inspiration.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Alzheimer's Disease

Alzheimer's disease is a neurodegenerative disorder that leads to gradual decline in memory and cognition. As the disease progresses, the damage to the nerve cells in the brain causes individuals to develop additional problems with basic physical functions such as breathing and swallowing. Ultimately, within four to six years after diagnosis, it becomes fatal. According to the 2009 Alzheimer's disease Facts and Figures, AD was the sixth leading cause of death in the United States and fifth for those aged 65 and older. It should be noted that although age is the greatest contributing risk factor associated thus far for developing the disease, Alzheimer's is not a normal part of aging. In 2009, an estimated 5.3 million Americans had Alzheimer's disease (Alzheimer's Association, 2009). The prevalence of AD is expected to increase significantly over the next several years due to the aging of the baby boom population. By 2030, it is projected that 7.7 million Americans will have Alzheimer's, magnified even further in 2050 with approximately 11 to 16 million people. It is a devastating illness that not only has economic ramifications but social and psychological as well. While many individuals with Alzheimer's disease are initially cared for at home, most are eventually admitted to specialized facilities for professional care. As such, this study focuses on exploring the effect of the environment and sensory stimulation on the social and psychological wellbeing of persons with Alzheimer's and their families in care facilities.

Alzheimer's disease is the most common type of dementia, accounting for 40 to 80 percent of all diagnosed cases in Americans. Studies have shown that it accounts for 47 percent for people aged 71-79 and 80 percent for people aged 90 and older (Alzheimer's Association, 2009).

While age seems to be the greatest attributable risk factor in developing the disease, there are a number of social and genetic factors associated with the prevalence of the disease. One such finding is more women are found to have Alzheimer's than men. In 2008, it was estimated that 2.4 million women and 1 million men aged 71 and older had dementia. This in part relates to the fact that the average lifespan of women is typically longer than of men. A social factor that has been explored through studies is the number of years of education a person has on the development of Alzheimer's disease. People with fewer years of education appear to be at higher risk for Alzheimer's and other dementias than those with more years of education. Researchers observed that people who experience a life-long pattern of cognitive stimulation, usually associated with educational and occupational attainment, showed significantly lower frequency of AD than people without such stimulation (Friedland et al, 2001; Letenneur et al, 1999). Fewer years of education is generally related to a myriad of other factors such as lower levels of occupational attainment, and higher prevalence of physical health conditions in adulthood, that are also associated with the development of dementia.

While Alzheimer's disease affects individuals in different ways, the most notable conditions of the disease are the gradual loss of memory and ability to remember new information. As the damage spreads, individuals experience difficulty processing thoughts, confusion and disorientation, and trouble communicating. Further along in

the disease, they exhibit wandering, rummaging, and often other unsafe behaviors. In advanced stages, people need help with activities of daily living such as bathing, dressing, and eating. In the final stages of the disease, they lose their ability to communicate clearly, fail to recognize loved ones, and require specialized care. The following sections further describe the debilitating changes that are associated with Alzheimer's, their impact on daily life, along with some of the focused therapies and interventions used to enhance cognition, communication and interaction.

## **1.2 Changes Associated with Alzheimer's Disease**

Alzheimer's disease is a degenerative disorder that is associated with decline relative to a myriad of cognitive and physical conditions. These changes impact not only the quality of life of the resident but also that of family and staff who provide care.

Outlined in these sections are the challenges that caregivers face when working with those with Alzheimer's disease and opportunities caregivers have to provide help.

### **1.2.1 Alzheimer's Disease: Changes Related to Memory and Cognition**

Alzheimer's disease is distinguished from other dementias. The cognitive deficits and interferences are independent from the behavioral characteristics caused by other neurological problems such as a stroke, Parkinson's disease, Huntington's or effects of substance abuse. Unlike other dementias, the cognitive deficits for AD do not occur only during delirium or result from depression or other psychiatric problems.

Although cognitive decline is a generalized condition with aging, the effects are greater and further intensified with the progression of Alzheimer's disease. Changes are attributable to the damage to various parts of the brain. The neocortex, the largest and most prominent part of the brain, can lose as much as one-third of its volume in a

person with Alzheimer's. This shrinkage begins before clinical symptoms are evident but can be detected by a computed tomography (CT) scan or magnetic resonance imaging (MRI) (Tappen, 1997).

At the cellular level, the damages that occur in Alzheimer's include changes in the metabolism of neurons, and decline in cell functioning and communication between neurons. Neurons in the cerebral cortex in Alzheimer's show dramatic changes including neurofibrillary tangles (NFT), neuritic plaques (NP), granulovacuolar degeneration, and overall neuronal cell loss (Zec, 1993). In postmortem examinations of brains of people with Alzheimer's, researchers found plaques and tangles within cell bodies of the neocortex and hippocampus. While tangles and plaque may appear in brain tissues of cognitively intact older people, the high concentration is evidence of Alzheimer's disease. Also identified in brains of AD patients is the significant decrease in levels of several neurotransmitters including Acetylcholine that is associated with memory functioning (Kolb & Wishaw, 1990).

The impact to the limbic system greatly challenges the ability to carry out key functions of living. The system that includes the hippocampus and amygdala is especially critical for memory and cognition. The hippocampus, responsible for recording new information, processing it, and sending it to other parts of the brain to be further processed and stored becomes highly compromised. By mid-stages of the disease, a person has limited capacity to learn new information. As the disease progresses, the frequency of memory lapses increases and the rate of forgetting becomes more rapid, often resulting in behaviors such as repeating the same questions and statements (Zec, 1993). The frontal lobe, the site of judgment, reasoning, decision-making and sequencing tasks, is also affected by the disease (Zeisel & Raia,

2000). All of these compromised functions make it difficult to carry out personal care and everyday tasks.

### **1.2.2 Alzheimer's Disease: Changes Related to Sensory Perception**

While changes to sensory perception are associated with the normal process of aging, with Alzheimer's disease, some of these changes are exacerbated by the physical alterations in the brain.

Everyone can expect to experience common age-related changes in vision. One in six Americans (13.5 million) aged 45 and older report some sort of vision problems (Stuenkel, 2003). At around 40 to 50 years of age, the lens of the eye becomes denser, more yellow and less elastic, scattering light and making it difficult to focus on tasks such as reading. With the combined effects of decreased pupil size and changes to the lens, the amount of light that reaches the retina is reduced by two-thirds for people aged 65 and older (Noell-Waggoner, 2002). Older adults therefore require between three to five times more light than younger people. Other visual deficits are found in the adaptation to darkness, contrast sensitivity, color discrimination, glare, figure-ground separation, and detection and recognition of moving objects (Fozard et al, 1993; Kim & Park, 2010). Colors become less vivid and faded and distinguishing between similar light colors such as pastels become more difficult (Christenson, 1990).

Alzheimer's disease in later stages impacts the visual sensory pathways, producing deficits in a variety of visual functions in addition to what is experienced in normal age-related declines. In a study completed by Cronin-Golomb (1995), subjects with Alzheimer's disease showed disproportionate deficits on the blue and violet color axis.

These conditions in conjunction with changes to the occipital lobe impact functions related to decline in overall visual performance and memory. The deficits in processing and holding accurate visual information lead to an inability to hold it for memory. The visual and memory impairments challenge their ability to interact, thus often isolating them from family and friends (Crew, 2005). For a person with Alzheimer's, what he or she sees at any moment makes up his or her reality (Zeisel & Raia, 2000).

### **1.2.3 Alzheimer's Disease: Changes on Ability to Interact and Communicate**

Communication is an important aspect of maintaining a desired quality of life. It plays a substantial role in social support as it serves to maintain and retain feelings of connectedness to one's self and to the larger community of peers, friends and family (Levin-Madori, 2009). Being able to share one's thoughts, feelings, and opinions with others is important for emotional wellbeing. For people with Alzheimer's, this ability slowly but relentlessly declines as the disease progresses.

Communication involves both cognitive and motor processes. Although motor processes, such as movement of the tongue and jaw are not as affected by the disease, cognition is severely impaired. Problems begin to surface with difficulty in writing a letter, finding the right words, or naming objects. The ability to produce meaningful or complete sentences, and understand what is read begins to decline (Tappen, 1993). Adding to the challenge of forming words, hearing impairments also contribute to the decline in auditory comprehension. As a result, a person with Alzheimer's become extraordinarily dependent on body language to understand meaning (Zeisel & Raia, 2000). In a longitudinal 5-year study by Tomoeda and Bayles (1993), when given an oral communication test, people even in early stages of Alzheimer's were less concise,



more repetitive, had more incomplete statements, and had fewer ideas than people with the absence of cognitive impairment. By the middle stages of Alzheimer's disease, the ability to maintain a conversation, clarify misunderstandings, and fill in lost words or memories is challenged, leaving much of the responsibility of sustaining communication on the caregiver.

A mastery of communications skills and alternative approaches may help when connecting with a person with Alzheimer's disease. A simple rule of thumb is to use shorter, less complex sentences to facilitate communication (Tappen, 1993). In the late stages of the disease, even more reliance on nonverbal communication is needed on the part of the caregiver or family member. Strategies such as using touch to gain patient's attention, using props to stimulate interacting in the moment and talking about things that are significant to the person become important.

With the progression of the disease, people with Alzheimer's and dementia experience an altered sense of reality (Coste, 2003). Short-term memory is a fundamental component of normal conversation. As such, communicating within the frame of reality for the person with Alzheimer's is a necessary technique to enable greater conversation flow and mitigate the risk of agitation and confusion. Interacting in the moment serves as a key component of communication strategies. Avoidance of relying on short-term memory and resistance to correct people with AD around factual accuracy may improve the quality of engagement. Although it may be difficult for families and caregivers, prioritizing emotional connectedness and exchange with their loved one should supersede the need for facts.

### **1.3 Family Involvement & Interaction with Individuals with Alzheimer's Disease**

Social activity and social integration are generally associated with healthier cognitive functioning in elderly. In studies of social engagement and cognitive function with aging, social support was positively related to the proper functioning of working memory, perceptual speed and visuospatial ability. Research suggests that it is not necessarily the size of a social network a person has that is related to higher level of cognitive function but the satisfaction and quality of social relationships within one's network (Krueger et al, 2009). Although there are cognitive functions that a person with Alzheimer's disease loses, the capacity for stimulation, response, and enjoyment may be enriched by quality interaction between an individual and his or her social and physical environment (Jennings, 2004).

Contrary to the misconception that families abandon the institutionalized elderly, most families stay involved throughout the transition and care of their loved ones.

Continuing family involvement positively contributes to the quality of life either by improving psychological functioning (Green & Monahan, 1982) or by assuring quality of the institutional care (Fleming, 1998). According to studies, residents who had met their desire for visitors were more likely to report higher levels of satisfaction. In a family-staff intervention to facilitate communication with the resident, the study resulted in positive outcomes including a reduction in medication. Participating families reported better relations and indicated that residents responded more favorably to family visits (Gaugler, 2005).

The underlying disease makes interpersonal interactions especially difficult because it robs the individual of his or her persona, personal history, and ability to recognize and interact with others. As a result, family visits become especially challenging. Studies

on visit trends implicate that programmatic efforts to maintain family involvement over the duration of the resident's life should start early (Yamamoto-Mitani et al, 2002). Families that are able to maintain supportive, satisfying relationships despite the changes caused by the illness describe a more positive experience. In addition to the benefit of maintaining a relationship between the patient and family, these connections help patients to understand his or her identity and role within the family (Fazio et al, 1999).

Some research suggests that family care in nursing homes is based on the concept of “dual specialization,” where staff members tend to physical care whereas family members provide more emotional and psychological support (Gaugler, 2005). Family members often participate in such activities as grooming, cheering up the resident and taking outings and walks. A running theme in many research studies is that family involvement is associated with positive health outcomes for residents. In some studies, findings showed that having visitors was associated with slightly lower risk of infection and hospitalization for infections (Zimmerman et al, 2002). Therapeutic conversations were another engagement that significantly improved moods among nursing home residents with Alzheimer's disease. A study by Tappen and Williams (2009), found that a therapeutic counseling approach is an effective way to treat dysphoria—anxiety, depression, or unease—commonly found in individuals with Alzheimer's. Although more research is needed, the general association is that family involvement and increased social engagement lead to positive psychological and possibly physical outcomes for people with Alzheimer's disease (Greene & Monahan, 1982).

One of the biggest barriers affecting residents with Alzheimer's and their family members involves challenges to communication (Touzinsky, 1998). One of the most crucial aspects of promoting family involvement is educating family members about effective forms of verbal and non-verbal communication when interacting with elderly relatives. This issue becomes increasingly important when dealing with residents who have various forms of neurodegenerative illnesses (Cohen, 1999). Family visits can be more enjoyable and meaningful when proper communication techniques are utilized.

Caring for loved ones with Alzheimer's often leaves family members or caregivers with a sense of grief and sadness. A holistic form of assistance, one that attends to not only the needs of the patient but also of the family, should be a focus.

#### **1.4 Review of Interventions that Enhance Cognition, Communication, and Interaction for Individuals with Alzheimer's Disease**

Nonpharmacological interventions range from activities involving sensory stimulation to modifying a physical or social environment. The following sections provide a review of some of these interventions and how they enhance cognition and performance of activities of daily living, reinforce a positive sense of self and reduce agitation and distressed behaviors. For healthy elderly persons, cognitive interventions typically focus on training to improve current functioning with the goal of postponing or preventing future cognitive decline. For people with mild to moderate impairment, interventions are focused on remediation and restoration of functions. For people with progressive neurodegenerative disorders such as Alzheimer's, the intent is to combine procedural memory training, spaced retrieval,

skill acquisition, and compensatory strategies to optimize and extend cognitive and functional skills for as long as possible (Acevedo & Lowenstein, 2007).

Patients with Alzheimer's disease may experience behavioral and psychiatric symptoms that may cause great distress to them and their caregivers. Some of these symptoms include agitation, aggression, wandering, shouting, depression, apathy, and sleep disturbances (Overshott et al, 2004). The safe and effective management of these behavioral and psychiatric symptoms of AD is one of the greatest challenges clinicians face. Traditionally, pharmacological interventions have been the mainstay of treatments but there is growing evidence of nonpharmacological interventions to address these behavioral challenges.

Some of these interventions involve activities such as conversation and therapeutic touch, sensory stimulation and reconnecting to past life. For many residents with dementia living in long-term care facilities, treatment increases positive engagement within their environment and often decreases passive or distressed behaviors.

While cognitive rehabilitation will not cure Alzheimer's disease, it can aide in helping the patient function better through everyday tasks and have better interaction with family members and visitors (Clare & Woods, 2004).

#### **1.4.1 Sensory Stimulation**

Sensory stimulation has been used in a variety of ways as a nonpharmacological treatment to help individuals with cognitive impairment. The following sections explore the various approaches using sensory stimulation to improve cognitive

functioning, communication, and quality of life for persons with dementia and Alzheimer's disease.

#### **1.4.1.1 Therapeutic Touch Therapy**

Touch gives the opportunity to give and receive affection. It serves as a tool for engaging persons of Alzheimer's during conversation, as a means for sharing positive support, and also as a way to calm or reassure someone who is agitated. Many people enjoy the warm touch of a family member, friend, or caregiver, but others may not and require that permission be granted even for a hug goodbye. Knowing who, when, where, and how to provide touch is important (Baker, 2003). Stimulating a patient by providing tactile contact has the potential to provide several benefits to the care and treatment of people with dementia and Alzheimer's disease.

Agitation is a common behavior experienced by people with dementia. Linked with factors such as cognitive impairment, physical and social environments, past experiences, depression and social isolation (Cohen-Mansfield et al, 2007), some examples include repetitive acts and aggressive behaviors that are directed toward oneself or others. In several studies on the effect of therapeutic touch on behavioral symptoms in persons of dementia, the use of therapeutic touch with contact to the neck and shoulders twice daily reduced the occurrence of restlessness. Therapeutic touch is a non-invasive and nonpharmacologic alternative for individuals with behavioral symptoms associated with stress (Woods et al, 2009). In studies by Hawranik et al (2008) and Woods et al (2005), the use of therapeutic touch significantly reduced physical nonaggressive behaviors such as agitation and restlessness in individuals with Alzheimer's disease.

#### **1.4.1.2 Multi-Sensory Stimulation**

Multi-sensory stimulation or MSS is an intervention that uses a variety of equipment to stimulate the senses. The most notable MSS intervention is provided by the Snoezelen Room, a multi-sensory environment originated in the 1960s in the Netherlands. The treatment began as a way to help people with learning disabilities. Using equipment such as colored lights, fiber-optic sprays, bubble-tubes, music, aroma, and a variety of hand-held objects, the Snoezelen Room allows patients to experience a range of unpatterned visual, auditory, olfactory, and tactile stimuli (Baillon et al, 2004). The intervention provides a demand-free environment where memory or cognitive reasoning abilities are not required, reducing confusion and withdrawal (Baillon et al, 2002).

The treatment is also used for moderate to severe dementia patients where more structured approaches may fail. A study of MSS in psychiatric care showed that stimulation helped relax agitated patients and stimulate unresponsive ones. Baillon et al (2002) noted that it is not only the amount of stimulation that is important but also variation. In a study by Staal et al (2007), the data indicated that dementia patients who were provided multi-sensory stimulation through the Snoezelen Room experienced lower levels of agitation and apathy than the control group who received standard psychiatric care. Standard psychiatric inpatient care consisted of antipsychotics, mood-stabilizers, antidepressants, hospital environment, and occupational therapy. The group who received MSS had greater independence than the control group and scored higher on overall health.

In a study by Ozdemir and Akdemir (2009), they used a multi-sensory stimulation approach by incorporating music therapy, painting, and orienting interventions on

people with mild symptoms of Alzheimer's disease. The study showed that social activities and various combinations of cognitive stimulation activities play an important role in the early rehabilitation of Alzheimer's disease. In 2000, a controlled study of interventions for unmet needs of dementia patients showed that individualized music therapy for residents with dementia was highly effective in reducing agitation and nonaggressive behaviors (Gerner). These studies illustrate that non-pharmacological interventions have potential benefits over the use of medication.

#### **1.4.1.3 Reminiscence Therapy**

"Through reminiscence, we continually structure, maintain, and reconstruct our self-identities." Chaudhury, H. (1999). When social and emotional needs are addressed, feelings of self worth, mood and quality of life are enhanced. Furthermore, emotionally meaningful and therapeutically stimulating activities have the ability to enhance cognitive reserve. There are a number of studies and application of therapies centering on reminiscence that aim to empower, provide pleasure, and improve quality of life and the quality of care of the institutionalized aging.

Reminiscence therapy is found to improve socialization and comprehension, induce feelings of accomplishment and self-esteem, and ameliorate depression. The therapy involves sharing memories, increasing awareness of feelings, identifying positive relationships in the past, and recalling family history and life. In a study on the effects of short-term reminiscence therapy on demented elderly, therapy served as a way to help people recall various experiences from their past life and share them with others, promoting emotional stability and allowing them to share their knowledge and areas of expertise (Okumura et al. 2008).



In several therapy programs, the use of family photographs enabled participants to more easily recall and talk about meaningful memories. Mizen (2007) found that the use of family photographs stimulated memories from the distant past that do not deteriorate as readily as current memories. Reminiscing and talking about the past facilitated more engaged communication and often improved the residents' mood. Koretsky (2001) noted from a therapeutic study with seniors that the use of family images was an effective method to bridge life's transitions in a non-threatening way and to provide clear insights into people's past.

In a study by Yamagami et al (2007), the use of Activity Reminiscence Therapy (ART), as a brain-activating rehabilitation for both lucid and demented persons, used nostalgia to help with recall. This particular program allowed for role reversal as residents were able to teach younger caregivers how to use tools from their past that younger generations were not familiar with. By sharing knowledge, they were able to gain a sense of their social function. ART allowed for enjoyable stimulation, communication and role-reversal. Brain-activating rehabilitation has the potential to delay the functional decline and progression of dementia.

The Therapeutic Thematic Arts Program (TTAP) is a widely explored method of enhancing cognitive and psychosocial functioning for the geriatric population. TTAP is a multi-modal, art and recreation group therapy process that engages people with the intent to slow the progression of mild cognitive impairment (MCI) to Alzheimer's disease. The program focuses on nonverbal and verbal communication in a group context, helping to regulate functions within the cerebral cortex promoting brain wellness and skill retention among older adults (Levin-Madori, 2009). It works to maximize interaction, stimulate brain functioning, and support social and emotional

needs by using activities involving music and guided imagery, drawing and painting, food, themed events and work to stimulate three distinct brain systems: affective system, strategic system, and recognition system. Research indicates that stimulation of these three areas can change the mass and density of the brain.

In an exploratory study by Rijn et al (2010), researchers designed leisure products with the goal to develop conversation stimulating activities for people with dementia in nursing homes. The activities center on visual and auditory stimulation through the use of objects that are familiar and something residents can relate to. By using objects such as a hand-held telephone, a television, a radio, and a treasure box, residents were able to take turns manipulating the objects and talking about them. By manipulating the objects themselves, residents were provided a sense of control and allowed to practice their physical abilities through operating familiar objects. Technology is an effective resource in facilitating leisure and productive activities for people with dementia when provided in a comprehensible and familiar context.

Another tool used to enhance conversation skills for residents with dementia and Alzheimer's is a Memory wallet. Memory wallets consist of small cards that include biographical facts such as the individual's former occupation, number of children, and home address. These cards serve not only as personalized belongings that help orient residents but also as a tool for reminiscence and conversation. In a study by Bourgeois (1990, 1992), the wallets were found to improve and maintain conversational skills among residents with dementia and Alzheimer's. Tools like the memory wallet and scrapbook not only provide a catalyst for conversation among residents but can also assist staff in getting to know more about individuals, creating opportunities for more personalized care.

#### **1.4.1.4 Cognitive Stimulation and Training**

The cognitive reserve capacity of people with Alzheimer's disease is significantly reduced in the later course of the illness compared to the stages of early episodic memory loss. As functioning of the semantic network becomes less efficient, encoding and retrieval of information diminishes. While decline of cognitive abilities occurs with the progression of the illness, studies by De Vreese et al (2001) and Ball et al (2002) indicate that cognitive performance and memory tasks can be improved and retained through training and strong reinforcement and support during acquisition and retrieval of information. In other studies, researchers noted that cognitive training and therapies slowed decline, and for people with the absence of disease, reduced the risk of developing Alzheimer's. These findings lead to the inherent need to further explore the effectiveness of early interventions of cognitive stimulation and memory rehabilitation.

Cognitive rehabilitation and stimulation are relatively low-cost interventions that moderate the impact of failing memory in everyday activities (Kinsella et al, 2009). In a randomized controlled trial of early interventions for mild cognitive impairment, researchers found that cognitive strategies could be used to facilitate and strengthen the encoding and retrieval of information. One particular technique that was found to be effective with patients with Alzheimer's disease is duo cognitive support. This method involves the use of support at encoding and retrieval stages of learning and processing. Activating prior knowledge or anchoring it to a person's life event may be particularly effective as the information to be recalled is emotionally laden (Moayeri et al, 2000).

Although cognitive rehabilitation is not a cure for Alzheimer's disease, research indicates it can improve functioning of everyday tasks and interaction with family members and visitors (Clare & Woods, 2004). Spector et al (2003) ran a study that analyzed whether or not cognitive stimulation therapy could improve cognition and quality of life of people suffering from dementia. Participants were involved in games, music and singing, arts and crafts twice a week over a 14-week period. Cognitive function, quality of life, general behavior, communication, depression, and anxiety were measured. The study found that residents who received cognitive stimulation experienced improvement in communication and rated a higher quality of life than residents who did not participate. What is particularly interesting is that the degree of benefit for cognitive function appears similar to that attributable to acetylcholinesterase inhibitors that were used as the pharmacological treatment.

Cognitive stimulation for people with Alzheimer's disease is an effective method of cognitive rehabilitation. In 2006, a study by Cipriani et al found that patients with AD had significant improvements to cognitive ability by using a computer-based training program that stimulated attention, memory, perception, visuospatial cognition, language, and non-verbal intelligence. In a study by Jellinger (2010) of older adults with MCI, it was noted that practice effects might help tap into a person's cognitive plasticity, flexibility, or reserve that lends the notion of potential learning capabilities and preservation. Kim and Park (2010) found that repeated visual stimulation might be able to reverse or delay the deterioration in neural plasticity of the cortical circuit in mild stages of Alzheimer's disease patients. According to the findings by Kim and Park, there is substantial evidence now that demonstrates that the primary sensory cortex remains plastic in the adult brain. If a certain functional reserve is not completely depleted despite the cortical system's progressive degeneration due to

Alzheimer's disease, it may be possible to reverse, or at minimum, slow the progression through perceptual learning.

In 2002, Wilson et al indicated that frequent participation in cognitively stimulating activities was associated with reduced risk of developing Alzheimer's disease. The study was conducted with subjects with an absence of any clinical diagnosis of dementia. The research concluded that on average, a person who reported frequent cognitive activity was 47% less likely to develop AD than persons with infrequent activity. Arendash et al (2004) concluded that long-term cognitive stimulation could provide stabilization or improvement to Alzheimer's disease patients. By studying transgenic mice in enriched environments, they found that cognitive stimulation indeed slowed the cognitive decline of mice with AD and exhibited performance improvement. A study of human subjects showed that people who experience life-long pattern of cognitive stimulation are associated with lower prevalence of Alzheimer's disease (Friedland et al, 2001; Letenneur et al, 1999).

#### **1.4.2 Environmental Design**

The design of the built environment plays a powerful role in enabling people's physical, social and emotional wellbeing. Lawton and Simon's (1968) Environmental Docility Hypothesis states that the greater the need the individual has, the greater the impact environmental factors have on the individual. In the study of environmental design for people with dementia, Cohen and Weisman (1991) found that therapeutic environments could slow the decline of functional abilities. Modest changes in the environment often present significant positive outcomes. While design elements that protect and serve as a catalyst for health and wellbeing are relevant and imperative for

all people, this section focuses on specific elements that directly impact the care and support for people with dementia and Alzheimer's disease.

Environments for the aging should reinforce individuality, self-esteem, and dignity. With age, people often experience a narrowing of life spaces caused by physiological, psychological, and economic changes. With each transition, there is a loss of territory and possessions. Hoglund (1985) notes that this reduction in privacy and shrinking of life spaces may intensify the value of the items that are retained. As such, the design of the environment should be deliberate on preserving and reinforcing individuality and sense of self.

Privacy, personalization, and sensory comprehension are also important environmental design features to improve behavioral health outcomes of people with Alzheimer's disease. Non-institutional environments are associated with improved intellectual and emotional wellbeing, enhanced social interaction, and reduced agitation (Day et al, 2000). In a study by Zeisel et al (2003), residents in less institutional environments that provided a sense of familiarity and comfort expressed lower levels of verbal aggression than people living in more institutional settings.

Environments that provide adequate and varied social spaces, allow residents and visitors more opportunities and choices to use the setting that supports them best. John Zeisel (1999) noted that the more varied social spaces are, the more varied a residents' interaction will be. Interaction not only contributes to people's personhood but also their connectedness to the real world. In a study in 2003, Zeisel et al found that the degree of social withdrawal among residents decreased as variability among common spaces increased. While progression of dementia poses physical and

cognitive challenges often resulting in limiting spaces, it is important to discern a balance between environmental and operational safety with maximizing opportunities for residents to access as many benefits as possible (Hoglund, 1985).

Residents in care settings need opportunities to continue a meaningful and active life. This requires more than just having passive entertainment throughout the day. Activities and interactions that reaffirm one's identity and sense of self-worth are critical to wellbeing (Brawley, 1997). In many care facilities for people with dementia and Alzheimer's disease, there is a continuing struggle to create an environment that provides the right amount of stimulation. Many institutional settings are often characterized by a virtual absence of sensory or social stimulation, with people sitting passively in large undifferentiated spaces (Cohen & Weisman, 1991). While the presence of crowding numbers of people and activities can cause over stimulation and agitation, the absence of sensory stimulation can result in restlessness, boredom and inactivity (Morgan et al, 1999). As the desired levels of stimulation is attributable to a person's personality, past life experience, stage of disease, time of day, and particular source of stimulation (Cohen & Day, 1993), it is important to provide a variety of settings and activities that support individuality.

The design of care facilities and spaces for people with dementia and Alzheimer's should consider and support the holistic needs of the resident, caregiver, and family. Similar to other workplaces, an environment that effectively supports caregivers and staff increases job satisfaction, reduces turnover caused by burnout and improves morale. In addition to staff, families and loved ones are vulnerable to tremendous emotional strain and challenges when caring for people with Alzheimer's and dementia. The design of environments should support family visits and social

interaction to enhance the quality of communication and connection. Care settings that support visitors' needs may encourage more frequent and more rewarding visits (Cohen & Day, 1993).

Simple design elements such as nooks in hallways and small intimate spaces can be effective for casual social interaction. Lawton and Simon (1968) observed that these spatial elements allowed residents to socialize in passing without interfering with the movement of traffic.

Settings and tools that provide catalysts for conversation help create a more rewarding and engaging visit. Familiar artifacts and environments provide valuable association with the past and stimulate opportunities for social interaction, and meaningful activity. These resources often provide a diversion to family members searching for conversation topics, giving them additional ways to connect and reminisce.

### **1.5 Family Visit Program**

The Family Visit Program was developed with the intent to improve communication and quality of exchange between family members and loved ones with dementia and neurodegenerative diseases such as Alzheimer's. The Program draws from elements of environmental design and sensory stimulation to explore how each component impacts users. For this study, four treatments were reviewed: an arrangement of furniture on-site, a conversation booth, a book-style photo album, and a digital picture frame and stand.



### **1.5.1 Treatment 1: Arrangement of Furniture On-Site**

The basic use of furniture in the gathering room was to create a conventional environment and setting that is commonly found in many sitting rooms in homes and care facilities. The purpose of using this arrangement of furniture on-site was to examine the effect of this setting, relative to that of the conversation booth on engagement and interaction between family and residents.

### **1.5.2 Treatment 2: Conversation Booth**

The conversation booth, an ergonomic seating unit that accommodates up to four adults, provides an intimate space to meet and spend time for social interaction. The concepts used to design and construct the booth include: providing visual and auditory privacy to improve focus and reduce distractions, supporting a variety of body positions for comfort and preference, removing barriers to allow for touch, and supporting the physical and cognitive needs of the frail elderly.

### **1.5.3 Treatment 3: Book-style Photo Album**

The book-style photo album was used as a control treatment as it is a familiar and conventional method of viewing photographs. The purpose of using the album was to examine how this common display medium for sensory stimulation compares to the digital picture frame for quality of engagement and interaction between family and residents.

### **1.5.4 Treatment 4: Digital Picture Frame and Stand**

The digital picture frame and stand were used as an intervention of providing sensory stimulation and a tool for family members visiting with residents. The concepts that guided the development of this intervention included: clarity and focus to compensate

for decline in sensory capabilities, and intuitive control and manipulation for ease of control.

### **1.6 This Study—Exploratory Research**

This research is related to an exploratory study that was completed in 2008 by researcher, Sarah Blau. The intent of this iterative project was not to test hypotheses, but to gather qualitative and descriptive information about the effects of individualized design treatments on the perceived quality of communication and interaction during family visits. The goal was to implement and study the environmental and sensory stimulation components of the Family Visit Program and identify implications on communication strategies along with considerations for design of the physical settings where interaction takes place.

## **CHAPTER 2**

### **METHOD**

#### **2.1 Introduction**

This thesis represents work done as exploratory research examining the Family Visit Program and further study of a design intervention for people with Alzheimer's disease and dementia. The study explores the potential of designing physical environments, tools, and therapeutic activities to enhance communication and interaction between family members and residents experiencing cognitive decline.

#### **2.2 Research Treatment and Design**

##### **2.2.1 Research Treatments**

There were two interventions studied in this research, an environment intervention and a stimulus intervention. For each intervention there were two treatments. The environment intervention treatments were an arrangement of furniture on-site and a custom designed conversation booth. The stimulus intervention treatments were: a book-style photo album and a digital picture frame and stand. Treatments were designed and developed using research-based concepts recognized in Chapter 1, and results from a previous exploratory study of the Family Visit Program conducted by Sarah Blau. The treatments were used to examine design concepts related to the environment and sensory stimulation.

### **2.2.1.1 Treatment 1: Arrangement of Furniture On-site**

As a control treatment, lounge chairs were placed perpendicular to each other to provide seating for the visits. The set-up of lounge chairs used represents a typical setting for social interaction found in most home and care facilities. For residents in wheelchairs, one chair was removed to provide room to place them beside the visiting family member. The purpose of using this arrangement of furniture on-site was to examine the affect of a conventional environmental setting relative to that of the conversation booth on engagement and interaction between family and residents.



Illustration 2.1 Arrangement of Furniture. The illustration above depicts a typical social arrangement of furniture available in most home and care facilities.

### **2.2.1.2 Treatment 2: Conversation Booth**

The conversation booth served as one of the settings for the family visits. The ergonomic seating unit, accommodating up to four adults, provides an intimate and semi-private space to meet and spend time in. The high upholstered back and wooden panels at the sides work to provide a comfortable acoustical setting while providing some visual and auditory privacy from the rest of the surrounding. The curved booth supports individuals in a variety of postures, allows family members to sit next to each other at a comfortable conversation distance, and does not inhibit touch. The curve facilitates turning to look at each other. The booth was designed in consideration of the physical needs of the frail elderly. The fold-down arm rests and extended panel rods provide support for getting in and out of the booth. Additionally, two of the side seats flip-up to provide space for caregivers to safely transfer a resident between the booth and a wheelchair.

The conversation booth used in the previous exploratory study was redesigned and modified for use in this study. The modifications were guided by the results and feedback from participants from the previous study. The new design reduced the scale of the booth by shortening the height and removing the fabric canopy. The side panels were altered by changing the shape and adding visual thickness with the use of wooden dowel rods and trims. The trim detail allowed an addition of angled rods that can be used as structural support for individuals getting in and out of the seating unit. One of the goals for the modification was to soften the appearance of the booth. This was done by adding button details to the upholstered back of the seat.



Illustration 2.2 Conversation Booth. The curved, upholstered high-back booth creates an intimate and semi-private setting for family visits.



Illustration 2.3 Conversation Booth. The flip-up seats allow space to help with transfers from wheelchairs. The lock mechanism prevents unwanted movement.





Illustration 2.4 Conversation Booth. The dowel rods extending from the panels and fold down arms provide additional support for getting in and out of the seat.

### **2.2.1.3 Research Treatments 3: Book-style Photo Album**

The book-style photo album was used as a control against which visits using the alternative display medium of the digital picture frame could be compared. The purpose was to examine the issues of familiarity and focus relative to the level of enjoyment and acceptance of the sensory activity. While the digital display medium may hold the value of providing a larger more enhanced image, the photo-album allows users to hold the photographs and look through them in a more familiar way. Instead of the linear order of viewing the images on the digital picture frame, the photo album allows users to choose their own order to view and talk about the images. Two to three photographs were placed on each page for viewing. A standard photo album was purchased at a local arts and craft store.



Illustration 2.5 Book-style Photo Album. The photo book is a familiar display medium that is held on the user's lap for viewing.

#### **2.2.1.4 Research Treatment 4: Digital Picture Frame and Stand**

A 15" digital picture frame was used to run a slideshow of the family photographs. It allowed families to view one large photograph at a time. Photographs are highly visible due to integral display light. Using the remote that is affixed on the stand, families were able to view the photographs in a linear fashion. The adjustable stand was designed to support the digital picture frame for ease of viewing. Constructed with oak, a wide wood frame surrounds the digital image to help block distractions and a horizontal surface provides space to affix the digital display remote control. The stand was designed to be intuitive to accommodate a variety of viewing needs. The control handles, hinged frame, gas-lift stem, and five-star caster base allow users to change the viewing angles and distance, adjust the height, and move the stand easily.





Illustration 2.6 Digital Picture Frame and Stand. The stand includes tilt and swivel mechanisms, gas-lift stem, and mobile base to allow flexible and intuitive manipulation. (Blau, 2008)

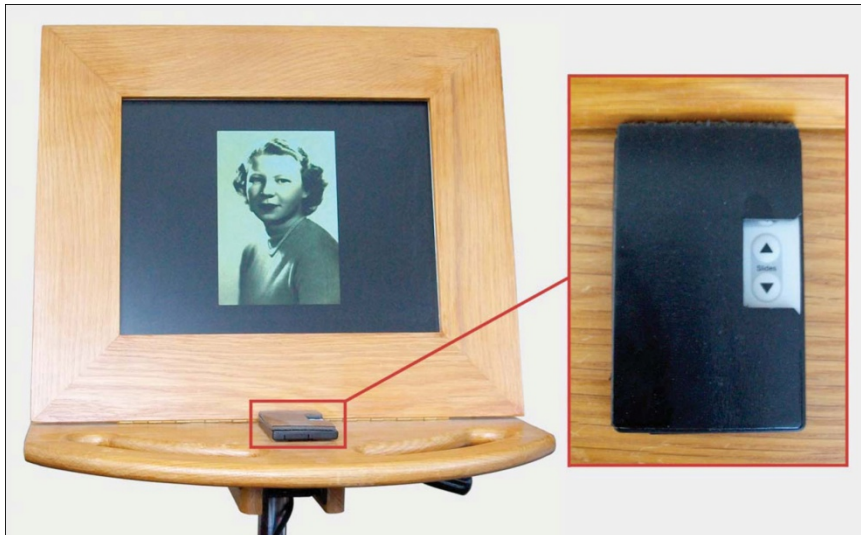


Illustration 2.7 Digital Picture Frame and Stand. The stand includes an affixed remote control that is used to flip through the digital images. (Blau, 2008)

### **2.2.2 Research Design and Structure**

The research was structured to evaluate the previously described design treatments within the context of family visits and interaction with family members with Alzheimer's disease or dementia residing in care facilities. As such, residents, family members, and facility staff were involved with the objective of observing actual use and gathering reactions to the study components.

The families were selected based on the level of dementia of the resident. The Director of Recreation at Beechtree Care Center played an integral role of identifying and assisting in contacting potential participants. Selection requirements included that the residents were in the early to mid-stages of dementia and that family members lived nearby to visit regularly. A letter was mailed to nine qualifying families stating the premise, describing the research, and inviting them to participate. A copy of the letter can be found in Appendix A. Five families responded favorably and were engaged with a phone conversation to answer any questions or concerns they had. At this time, families were requested to collect meaningful family photographs the resident could relate to and bring them to the scheduled meeting for scanning.

At the initial face-to-face meeting with the families, images were scanned, consent forms were reviewed and signed, and participants were briefed as to what they would need to do. They were informed about the three scheduled family visits and that the order of the last two visits would be randomly selected for them. All of the meetings and visits took place in the gathering room of Beechtree Care Center. The families brought their pre-selected photographs with the understanding that the images would be scanned at the meeting. This procedure avoided the issue of families having to entrust their valuables to the researcher overnight. The three visits were scheduled

with the family members during this initial meeting to get a sense of time and availability. Between the time of the initial meeting and scheduled first visit, all images were enhanced and adjusted before being loaded onto a memory SD card for the digital picture frame. Prior to visit B, families were contacted to remind them to bring their photographs so that the researcher could load them into the photo album.

The first family visit took place within one week of the initial preparation meeting. When families came to Beechtree for their scheduled visit, they first met with the research team to be briefed. The family was introduced to the setting of the visit and was provided a communication strategies handout sheet that matched the visit being held (A, B, or C). Communication Strategies Handout A,B,C, and D can be found in Appendix B. The family met with their loved one and escorted them to the gathering room on the first floor. The researcher and her assistant(s) video recorded the visits and took fields notes throughout the entire family meeting. At the end of the visit, each researcher present completed an observation sheet that rated the level of engagement of the resident and family member. The observation sheet can be found in Appendix C.

Although all of the families had Visit A first, the order in which they had visits B and C were randomized to prevent confounding factors. Figure 2.1 illustrates the order of the visits for each family.

Order of Visits					
	Family A	Family B	Family C	Family D	Family E
Visit A	1	1	1	1	1
Visit B	3	2	2	3	2
Visit C	2	3	3	2	3

Figure 2.1. Overview: Order of Family Visits.

Visit A, was the first visit for all of the families. Two lounge chairs available in the facility were placed perpendicular to each other in the common room. Residents and families met in this setting for the duration of their visit. Families received Communication Strategies Handout A, and were minimally prompted about what to do in the visit other than to ask them to sit in the setting that was provided. In the case the resident was in a wheelchair, one of the lounge chairs was removed.

For visit B, the lounge chairs were set-up identical to visit A. Prior to visit B, researchers inserted all the family photographs brought by the families into the book-style photo album. Families were provided with Communication Strategies Handout B and prompts were minimal other than to ask them to hold their visit in the arranged furniture setting and use the photo album loaded with images to guide their conversation with their loved ones.

For Visit C, the designed conversation booth and digital picture frame were introduced as the setting and tool for activity for the visit. Families were introduced to the supportive features of the booth such as the pull-down armrests and lift-up seats, and were guided in how to manipulate the digital picture frame and stand. They were

provided with Communication Strategies Handout C, and were again asked to hold their visit in the designated setting and use the digital picture frame to view family photographs together.

Following each of the visits, the researcher interviewed the resident in the conversation setting. Residents were asked simple questions about their overall experience, and their reactions to the conversation setting. Families were informed prior to the visits that their interview would be held not in the presence of the residents. After the residents were interviewed, family members accompanied their loved ones back to their rooms and came back to meet with the research team for the interview. Families were asked to rate the quality and enjoyment of the visits on a scale of one to ten. They were then asked questions pertaining to the engagement level of their loved ones as well as specific inquiries about the design components and features of the visit setting and activity.

At the conclusion of all three visits, family members and staff were debriefed about the entire project again and were asked several questions during an exit interview. During this final meeting, families were presented with Communication Strategies Handout D. They were provided with an explanation of the design intents and references to use for their future visits with their loved ones. Staff members, similarly, were informed about the design intents and were interviewed to gather any observations or reactions they had about the study.

Copies of the interview questions can be found in Appendix D.

At a date following the completion of all of the visits and exit interviews, each family was sent a letter of thanks for their participation, along with a CD containing digital copies of their scanned photographs, any still photographs, and video taken during the visit. These mementos were part of the compensation and incentive for families to participate, as they could serve as keepsakes of the later years of their loved one's life.

#### **2.2.2.1 Communication Strategies Handout**

Four handouts were created for use in the study. Each Communication Strategies Handout provided an appropriate amount of information for each of the visits as to not coach families for specific behaviors or reactions from the visit. Handout A had only basic communication strategies that did not pertain to the use of images. Handouts B and C were similar in that they guided families on the appropriate use of images and focus on conversing in the moment. Handout D, a comprehensive list of all of the strategies in the previous handouts and additional resources, was given as a reference sheet. A copy of all of the handouts is available in Appendix B.

### **2.3 Participants**

The study involved three groups of participants: residents of Beechtree Care Center, family members of the residents, and staff. There were a total of five residents, five family members, and six staff members that participated in this Family Visit Program Study.

The staff at Beechtree Care Center identified nine residents who were in the mild to moderate stages of cognitive decline and had family members who visited regularly. Of the nine families that were invited, five agreed to participate. The four families

that chose not to participate were unable to accommodate the time commitment for the duration of the study.

The five families that participated were organized alphabetically and labeled from A to E.

**Family A:**

The 87-year old male resident was diagnosed with Alzheimer's disease in 2003. His family noticed his declining memory in the 1990's. By 2006, his condition became more severe and he was removed from his house. His mobility is limited due to his placement in a wheelchair. In addition to the speech therapy he has received in the past, his daughter often uses music to engage him. Prior to his retirement, he worked as a life and health insurance agent. His family noted that his life was focused on helping the underprivileged, working arduously during the civil rights movements in the 1960's. He was actively involved in creating the first inter-racial council in his city, sponsored new families from Laos and Vietnam, and helped bring music and visual arts to the community.

The daughter and son-in-law typically visit the resident once or twice a week to help during mealtime or take him on short trips outside of the building. For the duration of the study, his daughter came to visit with him at least once a week. She works as a realtor in the area and brought with her an outgoing personality that engaged her father.

**Family B**

The 82-year old female resident was diagnosed with Alzheimer's disease in 1993. Her family began noticing signs of memory loss and confusion about three years prior to the diagnosis. She is able to walk without the use of any assistive devices and is regularly engaged in recreational activities at Beechtree. In her earlier years, she was a stay-at-home housewife and, for short periods of time, worked as a secretary and house cleaner.

The daughter typically visits the resident once or twice a week, bringing with her either pictures or magazines to share with her mother. She is recently retired and resides in the Ithaca area.

**Family C**

The 92-year old female resident suffers from mild dementia. This was discovered shortly after a stroke in late 2008. She was observed to decline steadily since an apparent second stroke in February of 2009. She received speech therapy, making good progress until her second stroke. Her mobility is limited due to her wheelchair use. In her earlier years, she worked as an occupational therapist. Her son noted that she also taught English to foreign students.

The son is a published writer who has spent many years working for the National Parks. Ever since he brought his mother up from North Carolina, he visits with her once or twice a week.



**Family D**

The 81-year old female resident was diagnosed in 2006 with Organic Brain Syndrome, dementia, and possible Alzheimer's disease. Her family noticed her change in behavior in late 2005. After her move from North Carolina in 2006, she resided in two local care facilities in Ithaca, NY. Her decline was furthered by a stroke in 2009. After her stroke, she spent some time in rehabilitation. But without much progress, she was placed in skilled nursing care. Her mobility is very limited due to the fact she is not transferable out of her wheelchair. The care staff uses a mechanical lift to transfer her from her bed to her wheelchair, where she spends most of her day. In her earlier years, she was actively involved in her community. She ran a day care, provided a home for displaced women, and was an instructor for jogging and exercise for the American Heart Association.

The daughter is a retired nurse that works as a volunteer for various organizations in the area. She visits her mother at least once or twice a week, often helping during meal times.

**Family E**

The 95-year old female resident suffers from mild dementia. Her family noticed signs of declining memory starting in 2007. In mid-2008, she was admitted into skilled nursing care. Since then, her decline has been furthered. In her earlier years, she worked as a sales person for clothing.

The granddaughter is a mother and a volunteer in the community. She spends one or two afternoons a week visiting her grandmother.

**Staff:**

There were six members of Beechtree's care and administrative staff that participated in the study. The CEO-Administrator was integral in gathering support from the staff. The Director of Recreation and Volunteer Services helped identify families that met the criteria presented as well as coordinated the center's activities to ensure the gathering room was available for the duration of the family visits. Several care staff were on hand to assist in transferring two of the residents onto the conversation booth. In addition to the administrative and recreation staff, the receptionist and maintenance personnel participated in an interview to provide their observations and reactions to the study components. One of the administrative staff, the Director of Development and Admissions, was familiar with the Family Visit Program from the previous exploratory study that was conducted in Longview Care Center in 2008. She was able to provide her thoughts and reactions to the changes made in this study and compare the environment and design of the setting with the previous site.

**2.4 Setting**

The research was conducted at Beechtree Care Center located in Ithaca, New York. Beechtree is a not-for-profit nursing and rehabilitation center. This study focused on residents living on the designated Alzheimer's Wing on the third floor. The family visits were held in a common room located on the first floor adjacent to the dining room. The newly renovated lounge serves as a venue for social gatherings and recreation activities, and is accessible by all residents and staff. The lounge is furnished with two lounge chairs, two sofas, and a large dining table with chairs, and is equipped with a small kitchenette. There are windows along the east side of the room that provide views out to the front courtyard and garden. On the west wall, there are doors with glass openings that visually connect the lounge to the dining room. The

entrance door was left ajar as it normally is. On the wall along the north side of the room are two doors leading to storage rooms. Staff accessed these rooms frequently during mealtimes.

The purpose of selecting this space as the setting for the Family Visit Program was to examine ways of creating a more intimate and private environment within the context of a large public space. While many family visits take place within residents' rooms, not everyone resides in a single occupancy room. Most of the resident rooms in Beechtree are double occupancy.

When conducting the family visits, the lounge chairs and conversation booth were situated in the northeast corner of the gathering room. This provided a direct view of the entrance, dining room, and courtyard. The purpose of using this corner was to examine the natural setting this common space provides, not manipulating it to hide all distractions taking place. The camera was set-up either in the southwest or southeast corner of the room to get an unobstructed view of the visits. The researcher(s) sat at the dining table approximately 20 feet from the families.



Illustration 2.8 Lounge with set-up for Visit A and B. The illustration above depicts the arrangement of lounge chairs facing the main entrance to the lounge.



Illustration 2.9 Lounge with set-up for Visit C. The illustration above depicts the conversation booth facing the main entrance to the lounge.

## **2.5 Data Collection**

There were three methods of data collection for this study: video recording of each family visit, voice-recorded interviews with all participants, and researcher field notes.

Video recording was employed to document the interaction of family members and residents during the visits. This was done using a high definition digital camcorder that recorded both video and sound and had the capability to take still pictures as well. The video camera was set-up prior to all of the family visits using a tripod approximately 20 feet away from the families. The camera was set far enough to be minimally intrusive while still capturing all participants interacting with one another.

Interviews were conducted following each of the visits. Residents were interviewed first and in the setting of the visit. Family participants were interviewed separately and after they escorted their loved ones back up to the resident floor. At the completion of all of the family visits, staff participants were interviewed to gather additional information about the residents and any reactions to the study. All interviews and meetings with the participants took place in the gathering room and were recorded using a voice recorder and through detailed notes.

Field notes were taken by researchers present to note any reactions or observations of the family visits. All of the researchers who observed the family visits were required to fill out a short observation form that not only included personal notes but also a rating of 1 to 10 of the engagement level perceived during the family visit. The observation sheet can be found in Appendix C.

## **2.6 Data Analysis**

This is a qualitative study that employed descriptive narratives and video still footages to document a summary of observations and findings.

There were three data collection methods that were employed to obtain information from the Family Visit Program: video recordings, interviews, and field notes. Each source was organized by grouping data by family and visit and analyzed to determine the effects of the setting design and sensory intervention on the quality of family interaction.

The collected information was used to develop a comprehensive profile of each family and their visits. The video recordings, interviews, and field notes were used as reference tools to compare and verify observations made of the environment, sensory activity, and interaction during the visits.

Collected data was organized and summarized using matrixes. These served as tools to compare the variables and seek commonalities that could be further analyzed. The four main study treatments were analyzed in relation to the design concepts of the Family Visit Program. These concepts included: providing visual connection through body positioning, enabling touch, eliminating distraction, providing focus, and supporting accessibility. Other particular observations made were in regards to the level of engagement of the resident and the family member.

Due to the exploratory nature of this study, all of the visits were analyzed in detail to gather a thorough understanding of what variables and factors contribute to creating a rewarding visit for families.

### **2.6.1 Video Analysis**

The video footages were used as a reference tool to compare and verify field observations made by the researcher and responses gathered from family members during interviews. The footages were also used to catch observations that may have been missed by the field notes and interviews. In particular, video stills were used to illustrate key observations and capture documented evidence of behaviors, reactions, and body positioning during visits.

### **2.6.2 Interviews**

Interview responses were transcribed from the audio recording of the interviews with each participant. Interviews with all of the participants were used to gain qualitative responses and reactions to the study interventions. The responses were organized for each family and used to help develop the detailed profile of each visit. Responses were compared with video analysis and field notes for verification.

### **2.6.3 Researcher Field Notes**

Field notes were analyzed for researcher reactions and observations on activities taking place in the environment and interaction of family members during the visits. These observations were compared with video analysis and interview responses. In particular, the researcher numeric ratings of engagement levels of the resident and family member were compared with the perceived quality of the visit noted by the family member in the interview.

## **CHAPTER 3**

### **FINDINGS & RESULTS**

The findings and results are presented in a narrative and pictorial organization to illustrate each visit experience between family members and their loved one.

#### **3.1 General Visit Information**

All of the residents except Family A were female. A detailed profile of each family can be found in Chapter 2.3. Each family participant had one resident and one family member for the visits. For families A, B, and D, the daughter of the resident was the weekly visitor. For Family C, the son was the visitor. For Family E, the granddaughter was the visitor.

The duration of visits for each family ranged from 9 minutes to 54 minutes. On average, family visits were 28.6 minutes long. Figure 3.1 provides information about visit durations per family.

The number of images each family selected to use ranged from 17 to 63 (refer to Figure 3.1). Family A selected 23 images, Family B- 17 images, Family C- 63 images, Family D- 25 images, and Family E- 42 images. Family C used 32 pictures for Visit B (photo book) and used all 63 images for Visit C (digital picture frame).



Number of Images and Length of Family Visit										
	Family A		Family B		Family C		Family D		Family E	
	# Images	Length of visit (min)	# Images	Length of visit (min)	# Images	Length of visit (min)	# Images	Length of visit (min)	# Images	Length of visit (min)
Visit A	N/A	28	N/A	28	N/A	33	N/A	9	N/A	33
Visit B	23	36	17	25	32	22	25	14	42	34
Visit C	23	22	17	38	63	54	25	16	42	37

Figure 3.1 Overview: Number of Images and Length of Family Visit.

There were a total of six staff members from Beechtree Care Center that participated in an interview to gather reactions about the study. Their responses and reactions can be found in Section 3.7.

The following sections provide an overview of each family and their three visits as part of the Family Visit Program. The intent of the general descriptions is to provide context around the relationship and visit experience for each family. The subsequent section evaluates each visit based on design concepts identified in the FVP study: Body Positioning and Visual Connection, Enabling Touch, Eliminating Distraction, Providing Focus, Supporting Accessibility, and additional insights. The on-site observations were cross-analyzed using three data sources: researcher field notes, video footage, and interview with the resident and family.

## **3.2 Family A**

All of the visits were between the 87-year old male resident and one family member, his daughter. A detailed profile of this family may be found in chapter 2.3.

### **3.2.1 General Description of Visits**

#### **3.2.1.1 Visit A: General Description**

This visit was 28 minutes long, beginning at 3:45PM and ending at 4:18PM.

The visit was perceived to be meaningful and enjoyable for the family member as evident in the rating the daughter gave for the visit of a 7 or 8 out of 10. She noted that while visits with her father are somewhat varied, this visit was similar and representative of many of her other visits. The overall mood and energy of the resident and family member were positive, reflected by their continuous exchange of smiles and laughter.

The daughter initiated conversation and exchange by asking questions and repeating similar sentences she interpreted her father was saying. While the resident was attentive, his verbal ability to respond was limited to mumbling with few identifiable words. When he responded, he tended to do so with context appropriate responses. For instance, in the presence of humor, he responded with a smile or short laugh.

The strength of engagement and interaction between the resident and his daughter was primarily through emotional responses such as smiling, laughing, and providing affectionate touch. The daughter frequently held his hand and rubbed his back. They often sat in silence while holding hands. The father was fixated on her hands as he

touched them gently. In two instances, he touched her chin and stroked her hair lovingly.

#### **3.2.1.2 Visit B: General Description**

This visit was 36 minutes long, beginning at 1:36PM and ending at 2:12PM.

This visit was perceived to be meaningful and personal for the family member as evident in the rating she gave for the visit of an 8 or 9 out of 10. When asked to compare the quality of this visit to other visits, she replied that while they typically have good visits, this was slightly better. “He is just fun to be around and is good natured. Even if he is not able to be verbal in the way we think of verbal, he is pretty communicative.” Although he had difficulty making coherent words or sentences, when spoken to, he responded most of the time with a look, a smile, or a few words.

When the daughter presented the photo album, the resident quickly took it into his arms, crossed his legs, adjusted his glasses and began flipping through the pages. Although he did not initiate conversation, it was clear that several of the pictures evoked strong emotion. After several rounds of looking at a picture of his sister, he finally called out her name. When he saw a picture of himself as a young boy with his father, his face lit up. The emotional exchange between the father and daughter were positive and continuous.

### **3.2.1.3 Visit C: General Description**

This visit was 22 minutes long, beginning at 3:45PM and ending at 4:07PM.

This visit was perceived to be meaningful and enjoyable but not quite as productive as the other visits as evident in the rating the family member gave of a 7 out of 10. This was partly attributed to the technical difficulties with the pictures stuck in a slideshow mode that flipped through more quickly than desired. While the daughter was able to control some of the viewing by going back to a photograph using the remote control, slideshow mode disrupted the flow of viewing. Although she did not believe the glitch to be a significant hindrance to the quality of her visit, she felt it would have been helpful for her father to view at his desired pace. She noted that it takes a while for him to engage in a photograph. By the time he processed the image, the slideshow moved onto a new picture.

During the visit, an elderly female resident wheeled into the room repeatedly shouting for someone. After several minutes, she was escorted out of the room and the visit resumed normally. The daughter re-engaged her father by putting her arm around him and making eye contact by turning her head more closely towards his line of sight. She asked questions such as, “Do you remember that? Do you like this picture? Does it make you happy?” Although her father seldom replied with words, in one instance, he muttered the name of his son-in-law in the picture after ten seconds had lapsed. While the family photographs were positive tools in engaging with the resident, the disruptions challenged the flow of exchange.

### 3.2.2 Comparison Across Visits Per Design Concept

#### Body Positioning & Visual Connection

Visit A:



Illustration 3.1: Visual connection between the resident and family member (Video Footage, A, Family A)

Due to the difference in seat height of the wheelchair and the lounge chair, the daughter was positioned six to eight inches below her father. To place herself in direct line of sight of her father, she sat at the edge of her chair, leaned forward, and looked up at him. For the duration of the visit, she leaned over, balancing herself by placing her elbow on the arm of his wheelchair. The resident remained in his chair in the same upright position, sitting back and moving his head slightly to look at his daughter.



Illustration 3.2: Side-by-side body positioning to view material (Video Footage, A, Family A)

In one instance as they were looking at a sheet of paper together, the daughter positioned herself side-by-side with her father. She sat at the edge of her chair, twisting her body and balancing herself using the arm rests.

#### Visit B:



Illustration 3.3: Visual connection between the resident and family member (Video Footage, B, Family A)

The family member showed similar body positioning as in Visit A. She sat at the edge of her seat leaning towards her father.

Visit C:



Illustration 3.4: Visual connection between the resident and family member (Video Footage, C. Family A)

Compared to the wheelchair and lounge chair setting, the booth enabled the daughter and her father to sit closer to each other and make leveled eye contact. By pivoting their bodies closer together, they were able to share a more intimate conversation distance and visual connectivity. For the duration of the visit, the resident's gaze and focus were mostly towards the digital picture frame while the daughter alternated between looking and talking about the picture and looking up at her father.



## Enabling Touch

Visit A:



Illustration 3.5: Touch exchange between the resident and family member (Video Footage, A. Family A)

Although there was limited verbal exchange, the resident and his daughter were affectionately engaged with emotional responses and pleasantries through smiles, laughs, and touches. The daughter frequently held his hand and rubbed his back. While they sat in silence holding hands, the father touched his daughter's hands gently. In two instances, he touched her chin and stroked her hair lovingly.



Visit B:



Illustration 3.6: Touch exchange between the resident and family member (Video Footage, B, Family A)

While touch was observed to happen less frequently in this visit compared to visits A and C, the seating arrangement still enabled it to occur. The daughter was able to rub the resident's shoulder and back. Most of their attention was focused on viewing the photo book.

Visit C:



Illustration 3.7: Touch exchange between the resident and family member (Video Footage, C, Family A)

The booth seating enabled the resident and his daughter to sit right next to each other, staying physically connected throughout the visit. The height connection and proximity allowed the daughter to put her arm around her father as they looked and talked about the pictures.

## Eliminating Distraction

Visit A:



Illustration 3.8: Momentarily distracted by movement outside the room (Video Footage, A. Family A)

While the resident occasionally looked away from his daughter towards movement and sounds outside of the room, his attention was easily focused when spoken to. During the visit, several intercom messages went off in the room. This disruption did not affect the resident in any significant way. When a staff member came into the room to gather table clothes from the storage closet, the resident and his daughter paused to look up but resumed their visit momentarily.

Visit B:



Illustration 3.9: Momentarily distracted by people in the room (Video Footage, B. Family A)

Similar to Visit A, the auditory and visual disruptions from the overhead speaker, movement in the room and adjacent hallway, did not significantly affect the resident and his daughter. While he occasionally glanced over, he quickly refocused his attention to either his daughter or the photo album. On one occasion, they both looked up to see the people in the room. They soon returned their gaze onto the photo book.

Visit C:



Illustration 3.10: Momentarily distracted by people in the room (Video Footage, C. Family A)

During this visit, there were a number of auditory and visual disruptions. The siren went on in the background, there were messages over the speaker, and an unexpected resident wheeled in repetitiously calling out a name. While the resident glanced over a couple of times, he resumed his focus on the screen. The family member looked over the screen a few moments as if to observe what was happening outside of the room. While the booth panels and digital picture stand provided some focus to the activity and visit, the side privacy panels had limited impact as the visual distractions were straight ahead in line of sight.



## Providing Focus

Visit B:



Illustration 3.11: Family member pointing to focus attention on an image (Video Footage, B. Family A)

The daughter sat at the edge of her seat to look at the photo book with her father. To focus his attention on a specific picture, she leaned over and pointed from above and from the side of the book. They both used their fingers to move across the different pictures.

Visit C:



Illustration 3.12: Family member pointing to focus attention on image details (Video Footage, C. Family A)

The side-by-side positioning enabled the resident and his daughter to look at the photographs together more easily than the perpendicular setting. While the digital photo frame focused attention on one image at a time, the family member pointed to different details of the images.

### **Supporting Accessibility**

Visit C:

With the assistance of a staff member, the resident was carefully transferred from his wheelchair to the center seat of the conversation booth. While the booth's armrests were designed to support residents in sitting and rising from the seat, they were not used as the transfer was controlled entirely by the staff member.

### 3.2.3 Additional Insights

#### Crowding of the Feet

Visit A:



Illustration 3.13: Crowding of the feet (Video Footage, A. Family A)

An observation of interest in this setting was how the placement of the chairs affected body positioning and comfort of the space. As the wheelchair was perpendicular to the lounge chair, there was crowding around the feet. While the resident kept his feet on the wheelchair's footrest, the daughter's feet were limited to the space around and under the footrests. The daughter at around 13 minutes into the visit stretched out her left leg, keeping this position for the remainder of the visit.



Visit B:



Illustration 3.14: Crowding of the feet (Video Footage, B. Family A)

Similar to Visit A, there was again crowding by the feet due to the arrangement of the wheelchair relative to the angled placement of the separate lounge chair. The wheelchair was a physical barrier, limiting proximity, connectedness, and comfort for the family member.

Visit C:



Illustration 3.15: Crowding of the feet (Video Footage, C. Family A)

The base of the digital picture frame stand limited the ability to pull the pictures closer to the resident and crowded foot placement.

## **Enabling Control**

Visit B:



Illustration 3.16: Resident's control of photo album (Video Footage, B. Family A)

When presented with the photo album, the resident immediately picked up the book, crossed his legs, adjusted his glasses, and began browsing through the pictures. As a resident with limited physical and cognitive abilities, his showing of control of the activity without prompting was indicative of his comfort and familiarity with the object and behavior.

## **Intuitive Electronics to Facilitate Control**

Family A had Visit C in the booth before Visit B with the photo album. The family member noted that the album was a more familiar object for someone of her father's generation. She observed that her father was more in control of manipulating the book than the digital picture frame. An interesting finding is that her father is able to browse pictures on her touch-screen smart phone, indicating the opportunity to successfully use intuitive technologies to enable control even for people with limited cognitive and motor abilities.

### **Emotional Connection & Perceived Quality of Visit**

Although the resident's cognitive decline had reduced his verbal abilities, he communicated and responded through eye contact, smiles, simple words such as "okay" and "uh huh" and short chuckles. These positive emotional responses provide the family member with a sense of connectedness, helping to make visits meaningful and personal. Although the resident is unable to remember his daughter's name, his awareness and reciprocation of affection and enjoyment of her company is a major contributor to the perceived quality of visits.

### **3.3 Family B**

All of the visits were between the 82-year old female resident and her daughter. A detailed profile of this family may be found in chapter 2.3.

#### **3.3.1 General Description of Visits**

##### **3.3.1.1 Visit A: General Description**

This visit was 28 minutes long, beginning at 1:58PM and ending at 2:26PM.

This visit was perceived to be meaningful and enjoyable for the family member as evident in the rating the daughter gave for the visit of an 8 out of 10. While there were several moments of silence when trying to find things to talk about, the exchange between the mother and daughter was lively and focused when conversing about past experiences and stories of people they know.

The daughter noted in her introductory interview that it was helpful to have props to strike up conversation. This indeed was the first thing to happen when the two women sat down. The daughter picked up a magazine on the side table between the chairs and began browsing and commenting on the gardening images on a spread. After a few short minutes of talking about the magazine, the resident's interest faded and she initiated a new conversation with her daughter.

The mother and daughter's energy levels and moods were mostly positive throughout the visit. The resident displayed enthusiasm as she initiated conversation with her daughter. While the resident acknowledged her forgetfulness, she did not hold any reservation in storytelling. The daughter, aware of her mother's confusion, withheld

correcting her in efforts to continue the flow of conversation. The daughter commented in the follow-up interview that certain details her mother forgot were both personal and difficult. For instance, she confused the names of her husbands and details about her daughter's father.

They experienced some uneasiness during intermittent silences as they searched for something to talk about. While they used some of the visual and auditory distractions present as a conversation starter, these chats did not last long. The topics that elicited the most excitement were about past memories of their family members. The resident told animated stories about her mother and father, leaning forward and sitting upright in her chair as she impersonated her father. Those memories brought about a sense of nostalgia for both family members. They smiled and laughed, talking about quirks and personalities of their relatives. Once this topic was exhausted, they again experienced silence and sat back in their chairs. When the family member began to talk about errands and routine life schedules, the energy of the conversation faded in comparison. While there were intermittent pauses when they exhausted things to talk about, both participants noted enjoying their visit.

### **3.3.1.2 Visit B: General Description**

This visit was 25 minutes long, beginning at 1:52PM and ending at 2:17PM.

This visit was perceived to be meaningful and personal for the family member as evident in her rating for the visit of an 8 or 9 out of 10. The daughter and mother began and ended their visit in good moods. While there were low levels of outside noise at the onset of the visit, there were a lot of activity and auditory and visual distractions towards the end of the visit. The resident and daughter were not distracted

or bothered by the chatter and activity as long as it was outside of direct line of sight. In the follow-up interview, the resident confirmed that she was aware of the noise and chatter but as long as it was down the hallway, they did not bother her. Peripheral activities seemed to distract the family member more than they did the resident.

When the resident was presented with the photo book, she immediately placed the book on her lap and began flipping through the pages pointing and talking about the pictures. The daughter, constrained by the seating arrangement, observed from the side leaning forward. The two women conversed, pointed, and often chuckled while looking at the pictures. The resident shared a story and recollection for nearly all of the images. In the interview with the daughter, she noted that many of the stories her mother told were completely fabricated. To her mother, what she said was her reality and was convinced of it. The daughter refrained as best as she could from correcting her mother too often and nodded in agreement. Occasionally when she corrected her mother on a particular detail, it was expressed in a joking manner and both women chuckled.

After going through the scrapbook from beginning to end, the daughter took the book in her arms to inquire more about the pictures. It was evident that whoever controlled the book dominated and directed the conversation. While the daughter held the book, her mother sat back in her chair nodding. The resident seemed less engaged compared to when she held the book. Upon finishing talking about the book contents, the two women sat back in their chairs leaning on the side towards each other and looked at each other contently.

The resident and her daughter enjoyed viewing the photographs. Although the daughter was dismayed that her mother did not remember her father, she was delighted that her mother was interested in looking at the photographs noting that when first admitted into a nursing facility, she refused to look at any photographs. The daughter expressed that it was nice to have something to feed the conversation and exchange.

### **3.3.1.3 Visit C: General Description**

This visit was 38 minutes long, beginning at 1:38PM and ending at 2:16PM.

This visit was perceived to be meaningful and enjoyable for the family member as evident in the rating she gave for the visit of an 8 out of 10. Although the overall visit was perceived favorably, the energy of the interaction was not as high as the visit using the photo book. Some possible explanations may be the change in setting and body posture, mood at the onset of the visit, or the repetition of seeing the same photographs again. They spoke in softer tones mostly leaning far back into the seat, with their arms and legs crossed. While the angle of the seat seemed to limit eye contact, the side-by-side seating was helpful in focusing attention on single, enlarged images within their direct line of sight.

The daughter controlled the physical movement of the digital picture frame and advancing the images. Although she initially struggled to use the device, the daughter quickly gained familiarity and was able to advance the images easily. The one challenge both the resident and her daughter commented on was the speed at which the images cleared up for view. There were intermittent silences while waiting for a picture to come up. When the image cleared up, the resident immediately identified



people and setting of the photograph, or responded with a smile and chuckle. While the daughter asked questions, her mother did not need prompting as she was animated and told stories upon stories of people she knew. It was evident that some of the stories were not accurate as the daughter just paused in what seemed to be an attempt to correct her mother but instead, nodded in acknowledgment.

### 3.3.2 Comparison Across Visits Per Design Concept

#### Body Positioning & Visual Connection

Visit A:



Illustration 3.17: Visual connection between the resident and family member (Video Footage, A. Family B)

The resident and her daughter had no difficulty in connecting visually as they were able to shift their bodies with ease to face each other. Their body position mirrored in form with their legs crossed, sitting back in their chair, and leaning to their sides towards each other.

Visit B:



Illustration 3.18: Visual connection between the resident and family member (Video Footage, B. Family B)

Physical flexibility enabled the resident and her daughter to visually connect with each other with ease. However, in order to view the photos together the daughter had to shift her body towards her mother, leaning forward to peer over the top edge of the book.

Visit C:



Illustration 3.19: Visual connection between the resident and family member (Video Footage, C. Family B)

Both women turned their heads to make eye contact, waved their arms during a story, and pointed at details in the photograph. For most of the visit, they sat back in their seats looking at the photographs from a distance. They leaned over when they wanted to look at something more carefully, indicating a greater desire for clarity or increased size of the image and detail being viewed.

## Enabling Touch

Visit A:



Illustration 3.20: Touch exchange between the resident and family member (Video Footage, A. Family B)

Intermittently, the mother and daughter exchanged affection through gently holding hands. The resident leaned toward her daughter to reach for her arm as she engaged in storytelling.

Visit B:



Illustration 3.21: Limited touch exchange between the resident and family member (Video Footage, B. Family B)

Compared to the first visit where the resident and her daughter affectionately connected through touch, there was limited exchange of touch as they browsed the book. The only physical connection was made when they both pointed at a detail in the book.



Visit C:



Illustration 3.22: Touch exchange between the resident and family member (Video Footage, C. Family B)

Sitting side-by-side, the resident and her daughter remained physically connected for the duration of the visit. They leaned towards each other smiling and laughing, occasionally gently nudging each other.

## Eliminating Distraction

Visit A:



Illustration 3.23: Momentarily distracted by movement outside the window (Video Footage, A. Family B)

While there were some auditory and visual distractions throughout the visit, they did not cause significant disruptions to concentration or focus for the family. The resident and her daughter were able to ignore the occurrence or use it as a topic of the next conversation.



Visit B:



Illustration 3.24: Momentarily distracted by movement outside the room (Video Footage, B. Family B)

While there were significant local auditory and visual distractions halfway through the visit, these did not greatly affect the concentration or focus of the family and resident. The family member glanced over once as someone walked by the room. The resident was able to ignore most all nearby movement. While both resident and family member acknowledged that there were a lot of noises and activities going on, these did not pose a bother unless they were happening close by.

Visit C:



Illustration 3.25: Momentarily distracted while waiting for images to clear up on screen (Video Footage, C. Family B)

Within the family room and adjacent spaces, there were the usual loud conversations, intercom messages, noise of equipment and alarms. However, it did not significantly affect the flow of interaction between the resident and her daughter. The resident seemed momentarily distracted particularly around times when waiting for images to clear up on the digital picture frame. Her attention was focused immediately when the picture cleared up or when spoken to.

## Providing Focus

Visit A:



Illustration 3.26: Turning to focus on activity outside of the window (Video Footage, A. Family B)

The resident and her daughter had no difficulty staying visually focused on each other. The exception was during the conversation when the daughter pointed out that the birds were singing outside, encouraging her mother to look out the window. While the positioning of the chairs did not support the resident to turn her body completely to the left toward the window, this seating arrangement did enable them to come back quickly to their original position and focus on each other.

Visit B:



Illustration 3.27: Family member raising the book to focus attention on an image (Video Footage, B. Family B)

It was evident that the ability to focus on an image and its details were not optimally supported through the scrapbook medium and seating position. The limited direction of the viewing did not enable both viewers to look clearly, causing viewers to lean in and twist to get a closer look. They used one hand to prop the book up and open and the other to point towards pictures they were talking about.

### Visit C:



Illustration 3.28: Resident pointing and leaning in to focus attention on an image (Video Footage, C. Family B)

The resident and her daughter did not experience any significant challenges to focusing attention on each other or the visit activity. The resident noted that she enjoyed meeting in the gathering room as she felt some sense of privacy and intimacy for visits. The ability to focus on one, enlarged photograph in their direct line of sight helped focus the viewers' attentions. The resident and her daughter engaged in conversation and storytelling while learning in and focusing on images on the screen and looking over at each other to share warm sentiments and smiles.

## **Supporting Accessibility**

### **Visit A:**

As the resident was able to walk without an assistive device, she did not experience any significant challenges to accessibility. Although the resident has a hearing deficit in one ear, the family noted that it did not cause any problems communicating or understanding each other during the visit.

### **Visit B:**

While accessibility was not an issue, ergonomic comfort was not optimal as evident by both participants having to lean and twist their bodies frequently to view images together.

### **Visit C:**

Accessibility was again not an issue as both the resident and her daughter were able to sit next to each other at will in the seating unit provided. They were able to turn their heads and shift their bodies without difficulty to make eye contact. The resident's hearing deficit was not noted to be an issue for interaction. Although the seating unit was equipped with optional armrests and sidebars to assist getting in and out of the seat, these components were unused.



### 3.3.3 Additional Insights

#### Enabling Control

Visit B:



Illustration 3.29: Resident's control of photo album (Video Footage, B. Family B)

The resident was primarily in control of manipulating the scrapbook. While the family member occasionally stopped her mother from turning the page in order to point something out, the resident held control. A notable observation is that the person in control of the book was also the more dominant driver of the conversation. The resident initiated conversation by speaking to what was going on in the picture and who was involved. When the daughter took the book in her arms, she was the driver of conversation, asking questions and inquiring of details from her mother.

Visit C:



Illustration 3.30: Family member's control of photo screen (Video Footage, C. Family B)

Unlike the photobook, the family member solely controlled the digital picture frame. The resident mostly sat back to view the images, leaning forward to point something out or take a closer look. The handles on the stand appealed to the participant in control as they were used to swivel the stand and a place to rest their hand between button pressing on the control device to change pictures.

### **Emotional Connection & Perceived Quality of Visit**

Visit C:

While the resident had a very vivid recollection of stories and memories, many were fabricated. It was evident that some of the memory lapses and false details were disappointing to the family member as they were personal and meaningful. However, the positive engagement, energy, and exchange of sentiment throughout the visit enabled both participants to enjoy the visit and feel emotionally connected.



### **3.4 Family C**

All of the visits were between the 92-year old female resident and her son. A detailed profile of this family may be found in chapter 2.3.

#### **3.4.1 General Description of Visits**

##### **3.4.1.1 Visit A: General Description**

This visit was 33 minutes long, beginning at 9:45AM and ending at 10:18AM.

This visit was perceived to be meaningful but slightly contrived for the family member as evident in the rating he gave for the visit of a 6 out of 10. The family member noted in his interview that in a more natural setting, he would have been more relaxed, spontaneous, and physically expressive such as hugging and putting his arm around his mother more. Despite the resident's limited verbal abilities and the family member's initial reservations, they engaged in a pleasant exchange of emotion and sentiment.

Despite her declining sight and limited verbal skills, the resident was highly responsive and engaged throughout the visit evident by her contextually appropriate verbal and physical expressions. She maintained the flow of conversation urging her son to continue with his stories responding with a, "So?" or an, "oh" and "oh yes." She also mimicked the body language and energy of her son. She laughed and smiled with him, leaned forward when he leaned forward to make eye contact and at one point imitated him being goofy.

The speed of the resident's physical and verbal response indicated her ability to comprehend most if not the full context of the conversation. If she did not understand what her son was saying, she paused, gave a slightly confused look as she was thinking and then tried to repeat what her son said to signal him to elaborate.

While it was apparent that the resident struggled to recall details of people and events, she responded to memories and facts that her son brought up during the conversation. For instance, at 10am she could not recall what she ate for breakfast. However, when her son reminded her of his upcoming birthday and how old he was turning, she was surprised and gasped at the fact that her "baby was 63 years old." She was able to connect factual context with a genuine emotional response

#### **3.4.1.2 Visit B: General Description**

This visit was 22 minutes long, beginning at 1:37PM and ending at 1:59PM.

This visit was perceived to be meaningful and enjoyable for the family member as evident in the rating he gave for the visit of an 8 or 9 out of 10. The resident was not feeling well and it seemed unlikely that the visit would take place as scheduled. However, the resident agreed to meet in the family room and that she would let her son know if she wanted to go back to her room. While her energy level was low at the start of the visit, as the visit progressed she took little interest to stop the visit.

During the first seven minutes of the visit, the resident scanned the images quickly and at times disregarded her son's questions and comments with a quick nod or "yes" or "I know who they all are." As the visit progressed, the level of engagement and interest from the resident shifted as she took control of the album, flipped through the pages at

her own pace and engaged her son with smiles and questions. As she looked through the images a second time, she spent more time scanning up and down, then side to side, before wanting to flip to the next page. When her son pointed out a particular image, she leaned forward, adjusted her glasses and uncrossed her legs to look more closely. A point of interest was her preference and affinity to some pictures and not others. Although in her interview, she said that she “absolutely” recognized most people in the pictures except kids, she took more interest in some than others. The difficulty to focus both of their attention on a singular image was evident through the occasions when the son drew his mother’s attention away to look at a picture he was focused on.

What is fascinating about this visit is the progression of the resident’s level of engagement. Although it initially began with slight disinterest and agitation, it progressed into meaningful exchange, responding to humor, laughing and smiling, and really focusing in on certain images. When the son asked who someone was in the image, she took a moment to look up—pausing to think—and resumed her body position to identify who it was. This pausing elicited more positive energy from the family member, maintaining the energetic progression of reminiscing.

After going through the album twice, the second time more thorough than the first, the resident was ready for a break. The visit ended on a positive note as evident in the laughter and enthusiasm during the brief resident interview.

#### **3.4.1.3 Visit C: General Description**

This visit was 54 minutes long, beginning at 10:40AM and ending at 11:34AM.

This visit was perceived to be very meaningful and enjoyable for the family member as evident in his note that it was above average in comparison to other visits and his rating of a 9 or 10 out of 10. Both the resident and her son began the visit in good moods. Before the visit began, a staff member transferred the resident to the center seat of the booth from her wheelchair.

The visit began with the son explaining what the photo frame was and described it as a computer behind the frame. Intrigued, the resident responded, "Oh! Like an old time computer isn't it?" She immediately was delighted with the photographs displayed on the screen. She smiled, nodded and exclaimed, "Oh! Oh yeah!" and at times clapped and looked over to her son smiling. Within two minutes of the visit, the resident took control of the photo frame using the handles to swivel it back and forth. At times she rested her hand on the handle while pointed to an image with her other hand.

While her son controlled the remote to move between the images, the resident verbally controlled when she wanted to see the next one. When she was done with an image, she signaled, "Alright. Okay. C'mon, c'mon." Her speed of response and exchange lacked delay. While her gaze was focused on the frame and photographs, she listened attentively to her son describing pictures and telling stories. They elicited responses such as, "Ah yes. Okay. Oh!" When asked to identify people, she paused to think and replied with a name or, "I don't know." When she recognized photographs, she laughed and gasped, "Oh my goodness," as she leaned closer to the frame to examine the picture more closely. She hardly leaned back into the seat as she was intent on looking at every picture up close, thinking, pointing, and listening to her son. As previous visits, she was able to pick up on jokes, her son's sense of humor, and responded with smiles and laughter.

A total of 63 images were uploaded onto the frame per the family member's request. Although the resident and her son both grew tired after some time, she was determined to get through them all. At times, even indicating her frustration as she waited for several of the images to load, she exclaimed, "C'mon! C'mon!", motioning the image to appear. Her excitement and interest in the photographs were evident in her exclamation of, "Wait!" when her son tried to move to the next image.

In addition to talking about people in the picture, they talked about objects within it and the context of what was happening. The resident seemingly recognized herself in pictures as evident in her pointing to a woman in the picture and saying, "Hah. Look at our short dresses. I have long sleeves." A point of observation to note in this visit was the resident's ability to recognize people and details in photographs that did not occur in the previous visit looking at the same images in a scrapbook, indicating a potential benefit of the viewing medium for clarity and focus.

### 3.4.2 Comparison Across Visits Per Design Concept

#### Body Positioning & Visual Connection

Visit A:



Illustration 3.31: Visual connection between the resident and family member (Video Footage, A, Family C)

While the resident was mostly stationary in the wheelchair, her son sat at the edge of his seat to maintain close proximity to her and keep her attention towards him. Even as he adjusted to sit back halfway through the visit, they maintained clear line of visual connection. This aided in their ability to keep her focused on the conversation and on her son despite the distracting noises and people in the room. The direct face-to-face positioning supported her ability to not only respond to her son, but at times mimic his behavior as evident in the illustration above.

Visit B:



Illustration 3.32: Perpendicular body positioning to view material and make eye contact (Video Footage, B, Family C)

While the resident sat back comfortably in her wheelchair with her legs crossed looking at the album, the family member twisted his body to maintain visual connection to her and the photographs. As she took control of the book, her son leaned to the side to peer over the edge. As a result, the viewing experience was not at a synchronized pace. Her attention was often pulled away when prompted by her son to view an image he was looking at.

### Visit C:



Illustration 3.33: Visual connection between the resident and family member (Video Footage, C. Family C)

The side-by-side seating enabled the resident and her son to view photographs together in a more synchronized and focused way. They spent less time making eye contact with each other and more time viewing each photograph in detail. The resident was highly engaged as she pointed, asked questions, and told stories of what she saw on the screen. Although her mobility was limited, she looked up occasionally, shifting her body slightly to look at her son. The son swung his body around to get in front of her when he wanted to make eye contact and get her attention. The photo frame was in their direct line of sight and held their attention for most of the visit. They hardly sat back in their seat as they remained actively engaged, intently pointing and talking about each image.



## Enabling Touch

Visit A:



Illustration 3.34: Touch exchange between the resident and family member (Video Footage, A. Family C)

The perpendicular positioning of the wheelchair and the visitor seat may be a contributing factor to limiting physical exchange through touch. While the son was observed to occasionally lean over to share something with his mother, there was little exchange of touch. In one instance, they both reached out to hold hands momentarily but it required both the resident and her son to sit up and lean towards each other.

Visit B:



Illustration 3.35: Barriers to touch exchange between the resident and family member (Video Footage, B, Family C)

Similar to Visit A, the perpendicular placement of the wheelchair and seat was a major hindrance to synchronized focus on the activity and exchange of touch and physical affection. To exchange touch without sitting side-by-side would require the ability to extend arms and hands out to each other. For the duration of this visit, the resident's hand and arms were occupied by holding up the photobook. The son was observed to be holding up the book with her, leaning on the side of the chair to view the pictures, or releasing his clasp of balance only to momentarily point to an image. He used the armrest to prop himself up as he leaned fairly extensively for the entire duration of the viewing. The extended body position limited his ability to extend physical connectivity to his mother.

Visit C:



Illustration 3.36: Touch exchange between the resident and family member (Video Footage, C, Family C)

Eliminating barriers by sitting side-by-side enabled a sense of closeness and intimacy as the resident and her son engaged in viewing photographs and exchanging eye contact and occasional nudges. The seating positioning allowed close proximity where their faces were within two feet from each other. Although the resident's hearing was impaired, she noted not having any issue hearing or understanding her son.

## Eliminating Distraction

Visit A:



Illustration 3.37: Momentarily distracted by people in the room (Video Footage, A. Family C)

With the exception of the resident's initial curiosity of the people in the room, she was not distracted by any of the conversations, noise, and people passing through the room. She took a moment to scan the room but was then entirely focused on her son for the duration of the visit.



Visit B:



Illustration 3.38: Momentarily distracted by people in the room (Video Footage, B. Family C)

Throughout the visit, there were a number of external distractions. Among which included a staff member dropping in for a brief conversation, loud noises coming from the hallway, and the intercom and siren going off. However, it hardly drew away the resident's attention. When the staff member dropped by, she looked up momentarily but then resumed her position and gaze on the album. In contrast, the family member although able to stay visually focused on his mother and the images, was very distracted. He noted in the interview session that his mother was acclimated to the chaotic environment in that the distractions were amplified on the upper floors making the first floor seemingly calm.

Visit C:



Illustration 3.39: Momentarily distracted by people in the room (Video Footage, C. Family C)

While the resident occasionally looked over the screen while waiting for the next image to appear, her focus went quickly back to the frame and visit. Throughout the near hour-long visit, there were loud sirens and a number of intercom messages.

When asked about the noises post-visit, both the resident and her son replied that it didn't bother them. In the interview the son commented that the visiting room was much quieter than upstairs, referring to the distractions and noise upstairs as a "mad house." He observed that his mother was acclimated to being upstairs and that the family room was calm and quiet in comparison.

## Providing Focus

Visit A:



Illustration 3.40: Family member using hand gestures to capture attention (Video Footage, A. Family C)

The son effectively used hand gestures to focus and hold his mother's attention as he told her stories. He was quick to notice when her interest was fading and regained her attention by clarifying what he was saying, talking slowly, leaning forward, and using hand gestures. When he lost eye contact with her, he leaned up very close to regain her attention and focus.

Visit B:



Illustration 3.41: Family member drawing attention on an image (Video Footage, B. Family C)

While the album effectively served as a focal point for conversation exchange, the ability to control the pace of viewing and focus were challenged. Often, the son drew his mother's attention away in his effort to focus her attention on an image he wanted to draw conversation from. If she was interested in the image, she paused to examine it more closely. On several occasions, she quickly dismissed his efforts with a quick nod or, "yes" before moving on to the next spread. The resident controlled the book, sharing it with her son when he wanted to take a closer look. Rather than a synchronized activity, it was much more of a single viewing experience with the resident in possession of the viewing medium, driving the pace and visit.



Visit C:



Illustration 3.42: Family member and resident pointing and leaning in to focus attention on image details (Video Footage, C. Family C)

The resident and her son were both highly focused on the photographs for the entire duration of the visit. She was eager to go through all 63 images even though she was tired. She responded to her son pointing out something in the picture and reciprocated by pointing and asking him about people and objects on the screen. At times, she swiveled the frame using the handles for him to take a closer look. Even as her son used hand gestures while telling stories, her unwavering focus kept her gaze on the screen. She was keen to study each image, pointing, leaning in and looking very closely.

## **Supporting Accessibility**

### **Visit A:**

The resident in her wheelchair and was not transferred onto a lounge chair in the room. The family member noted the convenience of having her in her chair to enable greater mobility and flexibility throughout a visit. In her wheelchair, she used her hands to express her emotions, respond to her son, and bring objects closer to her face to read and decipher what was on it. Her limited vision and hearing did not pose any significant challenges to communicating with her son.

### **Visit B:**

The resident remained in her wheelchair while the family member joined her in an armchair next to her. The only physical challenge observed was briefly when the resident struggled to separate the vinyl pages of the photo album. Other than occasionally needing her son's assistance to separate and turn the page, she sat back in her wheelchair, crossed her legs, and leisurely scanned the album. For the majority of the visit, she controlled the album in her arms, bringing it close to her face when she wanted to look at details.

### **Visit C:**

The resident was transferred to the booth with the help of a staff assistant onsite. While the frame displayed enlarged images of the photographs, both the resident and her son leaned forward to examine more closely. The position and design of the frame was not optimal for viewing and comfort as the limitations to move the frame closer forced the viewers to sustain an uncomfortable body position for a long duration of time. Additionally, the feet of the stand prevented the ability to stretch out their legs.

### 3.4.3 Additional Insights

#### Crowding of the Feet

Visit C:



Illustration 3.43: Crowding of the feet due to base of the stand (Video Footage, C. Family C)

The base of the stand not only crowded the feet and made it challenging to stretch out their legs for balance and comfort, but it also limited the ability to move the pictures closer to the viewers. Instead, the resident and her son spent the majority of the visit leaning forward and crouching over to manipulate the stand and interact with the photographs.

## Enabling Control

Visit B:



Illustration 3.44: Resident's control of photo album (Video Footage, B. Family C)

Although the visit began with the resident seemingly agitated and uninterested, within a minute of looking through the photo album, she took the book into her arms, taking control over viewing and flipping through the pages. She displayed settling into a comfortable behavior of sitting back in her chair with her legs crossed, with the book in her arms, and adjusting her glasses when she wanted to take a closer look. When she wanted her son to look, she offered the book to him, shortly taking it back to continue viewing. She held the book directly in front of her, easing her ability to review the images upright, but making it difficult for her son to engage in the activity with her as he peered over the top edge of the book. When he pointed to an image engaging her with a question, she had her fingers at the corner, ready to turn the page, indicating the viewing was at the resident's control and pace and less of a joint and synchronized activity.

Visit C:



Illustration 3.45: Resident's control of photo album (Video Footage, C. Family C)

Within just two minutes from the start of the visit, the resident took control of the stand and frame. Using the handles, she swiveled the frame left and right seemingly intrigued by the device. She used the handles to roll the frame closer to them. Although her son controlled the remote to advance the images, the resident verbally controlled the pace at which they viewed each photograph. When she was ready to move on, she confirmed with an “okay” or “alright.”

### **Intuitive Electronics to Facilitate Control**

Visit C:

The family member noted in his interview that the digital picture frame was functionally intuitive as he was able to easily manipulate the remote control to advance images forward and back and use the handles to swivel and move the frame. The design of the handles became intuitive control enablers for both the resident and the family member. Within minutes from the start of the visit, the resident used the handles to swivel the frame, control the viewing and turn it towards her son when asking him questions about an image.

## **Emotional Connection & Perceived Quality of Visit**

### **Visit B:**

At the start of the visit, the family member noted that it seemed doubtful that the visit would happen at all as his mother was not feeling well and reluctant to come down to the family room. When she agreed to the visit and was presented the photo album she initially seemed disinterested, scanning and turning the pages quickly. As she got around to the second time with the album, her pace slowed as she reviewed each photograph carefully and shared them with her son. The amount of positive exchange increased as the visit progressed. At the end of the visit, the family member noted in his interview that this was an above average visit with his mother. He felt the images elicited positive feelings and effectively captured her attention. While at the beginning he sensed some agitation and that she likely felt a little put on the spot to remember people's names, after a few minutes, "she got really into them."

### **Visit C:**

Like the visit with the scrapbook, both the resident and her son really got into the pictures together and were able to focus on one at a time. The level of energy and excitement as she closely examined each photograph, identifying family members and friends, elicited positive emotions. Her son joked with her often, nudging her gently or laughing along with her. Even though she was not able to identify all names and people in the picture, she nodded and enthusiastically responded, "oh!" and "ah yes" when reminded of people they were looking at. She recognized her son in an image and joked along with him, "of course I know who that is" as she smiled and leaned towards him gently. Although both grew tired towards the end of the visit, she refused to stop and wanted to get through all of the images.

### **3.5 Family D**

All of the visits were between the 81-year old female resident and her daughter. A detailed profile of this family may be found in chapter 2.3.

#### **3.5.1 General Description of Visits**

##### **3.5.1.1 Visit A: General Description**

This visit was 9 minutes long, beginning at 2:00PM and ending at 2:09PM.

This visit was perceived to be better than most other visits as evident in the rating the daughter gave for the visit of a 9 out of 10. She noted the main reason being the absence of physical aggressiveness such as hitting, biting, and slapping. Although the visit was perceived to be relatively successful, it was not as meaningful and enjoyable for the family member as she hoped for greater responsiveness from her mother.

Although interaction and communication were challenged by the resident's physical and cognitive state, she and her daughter engaged with simple speech, smiles, and body language. Throughout the visit, the resident was highly distracted by sound, light, and objects in the space. She looked away on average a duration of five seconds at a time, often ignoring her daughter's questions or comments. Each time, the daughter focused her mother's attention with hand gestures and verbal prompts to look back at her. While she responded roughly half the time, there were a few instances when she responded clearly without delay. For instance, when her daughter asked if there was anything else she wanted to talk about, the resident responded, "No. Is there anything you want to talk about?"

### **3.5.1.2 Visit B: General Description**

This visit was 14 minutes long, beginning at 10:27AM and ending at 10:41AM.

This visit was perceived to be meaningful and personal for the family member as evident in her rating for the visit of a 9 out of 10. The resident exhibited no delay conversing and responding to her daughter, often taking the initiative to comment on a photograph. The daughter noted that she was uncertain of her mother's mood, describing that in the past her mother ripped up photographs. As a result, the daughter began printing photos on regular paper to protect the originals. Fortunately, the resident was observed to enjoy the photographs, smiling and laughing along with her daughter. The resident and her daughter shared sentimental moments viewing pictures of family. She exhibited tenderness as she smiled and turned her head toward her daughter. It was evident that some of the photographs elicited stronger responses. For instance, the photograph of the resident and her husband as a young couple made the resident emotional and teary. A particular photograph of her young daughter made her smile and laugh. She returned to this picture several times, each time smiling.

The resident on several occasions complained of pain. While her daughter verbally recognized that her mother was hurting, she continued the visit by flipping through the album a second time. The same photographs elicited positive emotions, however the mother was soon distracted by the pain and wanted to end the visit. The daughter later commented that her mother complains of pain when she is overwhelmed or when she does not want to do something. She sensed her mother was getting frustrated when asked too many pointed questions.



Of particular interest was the resident's ability to track sequence of life events and memories based on when and where the photograph was taken and the presence or absence of people. In viewing one photograph, the daughter asked her mother if her uncle was in the picture. She replied, "no." Her daughter asked again, "He wasn't born yet?" Her mother replied, "No, he wasn't born yet." In response to another photograph, the resident immediately made a comment about the house that had just been built. Her daughter noted she was surprised that her mother could accurately recall so much detail.

#### **3.5.1.3 Visit C: General Description**

This visit was 16 minutes long, beginning at 2:14PM and ending at 2:30PM.

While the visit was perceived to be meaningful and enjoyable for the family member as evident in the rating she gave for the visit of an 8 or 9 out of 10, this visit was challenged by a technical malfunction of the digital picture frame. It was stuck on a slideshow mode that flipped through the pictures too quickly or loaded too slowly. Despite the technical challenge and frustration, the daughter was able to maintain visual connection with her mother, focusing her attention by pointing at images and people and wrapping her arm around her mother's shoulder. Although her mother was not always responsive to her questions about people's names and identities or past memories, there were moments of seeming lucidity where the resident spoke clearly without delay, "no" or "yes" or "is this done, or not?" Towards the end of the visit, the resident displayed a moderate level of agitation. The family member ended the visit and took her mother upstairs. When the daughter returned for her interview, she shared that her mother instantly began hitting her. It is likely that this visit and the technical challenges created over-stimulation, causing extreme agitation.

### 3.5.2 Comparison Across Visits Per Design Concept

#### Body Positioning & Visual Connection

Visit A:



Illustration 3.46: Visual connection between the resident and family member (Video Footage, A. Family D)

The daughter placed her mother in the wheelchair almost directly across from her lounge chair. Without having to twist and shift their bodies uncomfortably, they maintained direct visual connection with each other. While the positioning of the seating units enabled easy eye contact, the size and placement of the wheelchair created some distance between mother and daughter. Additionally, the height of the wheelchair forced the resident to look down and the family member to look up during the visit.

Visit B:



Illustration 3.47: Visual connection between the resident and family member (Video Footage, B. Family D)

While sitting side-by-side enabled the daughter and her mother to view the photo album together, the daughter leaned and twisted her body to make eye-contact with her mother. The height of the lounge chair was lower than that of the wheelchair and, as a result, the daughter was forced to look up at her mother to make eye contact. While the resident's gaze was mostly down at the photo album, she occasionally turned her head to look at her daughter and smile.

Visit C:



Illustration 3.48: Visual connection between the resident and family member (Video Footage, C. Family D)

The slightly angled seating unit enabled them to look at the pictures together without the daughter having to twist her body. They occasionally looked at each other, sharing a warm smile after a picture. The daughter looked up at her mother after each photograph to gauge her mother's attention and response.

## Enabling Touch

Visit A:



Illustration 3.49: Physical distance and body positioning limit touch exchange (Video Footage, A. Family D)

As the resident and her daughter sat across each other positioned beyond arms reach, there was minimal physical contact. The only occurrence of physical contact was when the daughter got up to push her mother's wheelchair back to her room.



Visit B:



Illustration 3.50: Limited touch exchange between the resident and family member (Video Footage, B. Family D)

The only occurrence of touch exchange was when the daughter raised a tissue to help her mother wipe her mouth. For most of the visit, the daughter controlled and held the photo album in front of her mother, limiting free use of her arms to provide physical affection.

Visit C:



Illustration 3.51: Touch exchange between the resident and family member (Video Footage, C. Family D)

On several occurrences, there were endearing moments exchanged between the mother and daughter. When a photograph of her daughter came on the screen, the resident immediately pointed and called out an endearing form of her daughter's name. She then moved her hand towards her daughters face. The daughter held her mother's hand and touched her mothers forearm for a few seconds. When the resident's attention was compromised by noises and activities outside of the room, the daughter was able to regain her mother's attention by placing her arm around her shoulders.

## Eliminating Distraction

### Visit A



Illustration 3.52: Resident highly distracted by objects, noise, and movement (Video Footage, A. Family D)

The resident was highly distracted throughout the visit. She constantly shifted her gaze from one object or person to another. Although she made eye contact with her daughter, she looked away for approximately five seconds with each distraction. Even as the daughter spoke, the resident's attention drifted. It was when the daughter used hand gestures that her mother's visual attention was brought back.



Visit B:



Illustration 3.53: Momentarily distracted by people and objects in the room (Video Footage, B. Family D)

While the resident looked away from the photo album at people and objects in the room, her focus was brought back to the photographs with her daughter's prompting. The family member noted that the room was quiet and cozy and minimized distractions in comparison to the open and crowded settings on the resident floors.

Visit C:



Illustration 3.54: Momentarily distracted while waiting for images to clear up on the screen (Video Footage, C. Family D)

Despite the technical challenges of the digital picture frame not working properly, the resident was fairly focused on the photographs and her daughter. The mother stared at the screen waiting for images to load and pointed when the images cleared up. During the visit, there were a number of loud intercom messages and people talking right outside of the family room. The resident and family member did not give these disruptions any attention and continued their visit. It is likely that the resident was more susceptible to visual distractions over auditory.

## Providing Focus

Visit A:



Illustration 3.55: Focusing attention with hand gestures (Video Footage, A. Family D)

Although the resident was highly distracted by people and activities in and outside of the room, there were several instances of continuous focus on her daughter. When her daughter began to sing and asked her mother to sing along, the resident began to move her arm to the rhythm of the song. When the resident's gaze turned away, the daughter was able to draw her focus and attention back by hand gestures and verbally prompting her mother to turn her gaze back on her.



Visit B:



Illustration 3.56: Family member raising the book to focus attention on an image (Video Footage, B. Family D)

The resident tended to maintain focus, particularly when she was prompted with questions about the identity of people or places she lived. To maintain her mother's focus, the daughter pointed to images and raised the book closer to her mother's eyes so that she could see more clearly. The likely combination of her mother not being able to recall people in several of the pictures, inability to make the picture out, and the presence of too many pictures on a single spread, caused the resident to be overwhelmed. The daughter noted in her interview that fewer pictures on a page would have been much better. Her mother began complaining of pain, and indication that she was over stimulated and overwhelmed.

Visit C:



Illustration 3.57: Resident pointing and leaning in to focus on an image (Video Footage, C. Family D)

Given that the digital frame was mobile and freestanding, these features enabled the resident and family member to pull the frame closer, manipulate it, and point at details of the picture. On several instances, they pointed, held their hand out at the picture and looked at each other affectionately. While the technical glitch caused some of the pictures to flash across quickly, the focus throughout the visit was primarily on the screen. As a consequence of the fact that the resident was unable to transfer to the conversation booth and had to remain in her wheelchair, even with one seat raised to allow some space for the wheelchair in the seating unit the resident was not shielded from any visual distractions. Movement and activities outside of the room were visible in her direct line of sight and often pulled her attention away.

## **Supporting Accessibility**

### **Visit A:**

The resident remained in her specialized wheelchair for the duration of the visit. She was wheeled in and positioned across from the lounge chair designated for the family member.

### **Visit B:**

The resident remained in her wheelchair for the duration of the visit. The daughter pulled the lounge chair to be side-by-side with her mother. At one point, she moved her arm off of the arm of her mother's wheelchair assuming it might bother her. She began asking, "Am I in your..." and her mother finished her train of thought and quickly responded, "No, you're not in my way." The side-by-side position required the family member to twist and lean towards her mother and reach in front of her mother's lap to support the book in front of her.

### **Visit C:**

As the resident was non-transferrable, she was positioned next to her daughter who sat in the middle of the conversation booth. The wheelchair was too wide to be placed in the designated sides with the seat flipped up. What seemed intuitive are the handles carved into the wooden picture frame stand. The resident at times rested her hand on the handles as she stared at the screen. The family member used the handle to swivel and pull the stand towards them.

### 3.5.3 Additional Insights

#### Crowding of the Feet

Visit C:



Illustration 3.58: Crowding of the feet (Video Footage, C. Family D)

One of the primary challenges the five-star based digital picture frame stand posed was its hindrance on movement and comfort due to crowding of the feet and interference with the front wheels of the wheelchair. The base also limited the family's ability to pull the stand closer as evident in the family member leaning forward to point at an image.



## Enabling Control

Visit B:



Illustration 3.59: Resident's control of the photo album (Video Footage, B. Family D)

The family member noted that the photo album reflected a sense of oldness and familiarity that enabled her mother to take some control over it by holding it with one hand to balance it over her legs. The resident used her hand to point at particular pictures, controlling the focus of the family member and conversation. While the family member controlled turning the page, the resident controlled when it happened. When the daughter asked, “You ready to go to the next one [page]?” The resident directed, “go ahead.”

## Intuitive Electronics to Facilitate Control

Visit C:

The malfunctioning of the digital picture frame stand compromised the ability for the family to control the viewing of images. The physical structure of the stand was however seemingly intuitive as evident in both the family member and the resident using the carved wooden handle to hold and move the frame towards them.



## **Emotional Connection & Perceived Quality of Visit**

### **Visit A:**

The family member noted her desire and anticipation of greater responsiveness from her mother. While she understood her mother's challenges to respond and engage in flowing dialogue, she expressed that two-way exchange would make a significant difference in her perception of how meaningful and enjoyable a visit is. At one instance during the visit, the daughter described a favored picture they have of her as a kid. She tried to tap into her mother's memory and asked if she remembered it. Her mother replied, "no" and turned her gaze away.

### **Visit B:**

Compared to the initial visit without visual props, this visit had notably more two-way exchanges. The resident responded to her daughter's questions and prompts with little delay. On several occasions, she initiated comments about pictures. It was evident that some of the photographs elicited strong emotions such as sadness and happiness. When a picture of the daughter as a young child appeared, the mother and her daughter expressed fondness towards it and exchanged smiles and laughter. When the daughter described this picture of herself as a child during the first visit, her mother replied that she did not know the picture. In this visit, the particular picture was revisited several times as it made her mother very happy each time. When asked in an interview if she enjoyed the visit, the resident responded clearly and without delay, "Oh yes, I enjoyed it very much." The daughter noted in her post visit interview that she was moved by her mother's level of engagement, especially when pictures of her and her mother elicited positive emotions.

### Visit C:

Despite the challenges with the digital picture frame stand, the resident and her daughter were able to exchange endearing looks and smiles. Early on in the visit, the resident immediately recognized a picture of her daughter and called her “Becky Becky.” She moved her arm to gently caress her daughters face. They exchanged brief moments of endearing touches. While the visit and technical disruptions caused overstimulation, the visit was perceived as intimate and meaningful. In her interview, the family member described, “It felt cozy, comforting, and safe. Sometimes when you’re in a place like this, you don’t have that safety. And to me, it was satisfying sitting with her. It felt like it was our conversation.”

### **3.6 Family E**

All of the visits were between the 95-year old female resident and her granddaughter.

A detailed profile of this family may be found in chapter 2.3.

#### **3.6.1 General Description of Visits**

##### **3.6.1.1 Visit A: General Description**

This visit was 33 minutes long, beginning at 10:11AM and ending at 10:44AM.

This visit was perceived to be meaningful and enjoyable as evident in the rating the family member gave for the visit of a 9 out of 10. The granddaughter commented that visits are generally better when they are in the family room compared to when they are upstairs in her grandmother's room.

Overall, the resident was well engaged and sustained positive exchange and conversation with her visiting granddaughter. While there were a few instances when she did not understand what her granddaughter was saying or asking, she responded without delay. In most instances, she spoke in complete sentences and told detailed stories. For instance, she narrated how she loved to play the piano and how well she played. She described how she bought a large and expensive piano from a man who lived two streets down and that it filled up her living room. She continued to explain that she might have sold it back to the man some time after because he was sad to part with it. Although the accuracy of this story is unclear, her ability to sequence and recall emotions and feelings about this life event facilitated conversation with her granddaughter. The granddaughter was able to engage with questions and comments

such as whether her mother, the resident's daughter, played the piano and if the resident's sisters also took lessons. On several occasions, they laughed together about a humorous comment, or awareness of old age. The resident questioned, "Do you know how old I am?" The granddaughter replied, "You're about 95." The grandmother responded, "That's about right. I didn't think anyone knew how old I was." There was lightness to their conversation that elicited smiles and warm laughter.

While there were occasional short two to five second silent lulls during the visit, the resident and her granddaughter were able to start conversations from nearby props and real-time observations. In one instance, the resident commented that because there were so many cars parked outside, there must be a lot of people in the building. When the granddaughter was able to focus her attention on something she was wearing such as her ring or watch, the resident continued to lead the conversation by telling a related story. When the resident was slightly incoherent, the granddaughter just nodded and went along, encouraging her grandmother to continue her story.

For the duration of the visit, there was a person tuning a piano in the dining room across the hallway. The loud and disruptive noise did not seem to bother the resident at all. In fact, it was the family member who could not ignore it and made the first comment about it. Overall, while the conversation shifted from one topic to another, the granddaughter and the resident were able to exchange warm sentiments, updates on their lives, and a continuous exchange.

### **3.6.1.2 Visit B: General Description**

This visit was 34 minutes long, beginning at 10:42AM and ending at 11:16AM.

The visit was perceived to be meaningful and enjoyable as evident in the rating the family member gave for the visit of a 9 out of 10. The visiting granddaughter commented that visits are generally better when they are held in the family room, away from the chaos upstairs, and when she has access to things she can use to talk about with her grandmother. In the past she has brought in pictures, personal items and her laptop to share with her grandmother.

During the visit, the resident was quick to initiate conversation particularly by being the first to comment on a picture. She pointed at pictures and identified people by name. While the granddaughter later commented that it was challenging to withhold the urge to correct her grandmother, she was pleasantly surprised that her grandmother was able to accurately recall a lot more than she expected. While the resident was able to identify herself in the photographs, she consistently did not recognize her daughter, her visiting granddaughter's mother. Pictures of the resident's daughter seemed to stir up confusion. When the granddaughter pointed out that the picture was of her daughter, the resident responded, "No, I don't have a daughter named V." The granddaughter responded, "Oh, then I must be mistaken." Her grandmother then replied, "V died." Which then the granddaughter said, "That's right, grandma." The resident did not realize the girl in the picture, her daughter, had grown up to be so big and old. She mistook her daughter to have passed away when she was younger. "It's all starting to come back to me," said the resident. As the resident and her granddaughter continued to look through the album, they came across several other

pictures of the deceased daughter and the resident repeatedly did not recognize her. In the very last picture of her daughter, the resident paused for a moment and said, “It looks like you and half like me.” The granddaughter replied, “That’s because it’s V, you’re daughter, my mom.”

Despite the fact the resident’s recollection of people were not always accurate, she was quick to call out names, often stating it in form of a question to validate it with her granddaughter. The resident seemed more interested in recalling names than telling stories of those individuals or events during the time of the photograph. Nevertheless, she seemed content scanning through the photographs. They occasionally looked up at each other and smiled or let out a short chuckle.

#### **3.6.1.3 Visit C: General Description**

This visit was 37 minutes long, beginning at 10:26AM and ending at 11:03AM.

The visit was perceived to be meaningful and enjoyable as evident in the rating the family member gave for the visit of a 7 out of 10. The visiting granddaughter commented that while the previous visits (A and B) were better, all three visits were better than her usual visits with her grandmother. On this particular morning, a fire drill took place, disrupting the environment and visit flow. The resident also seemed very tired and disinterested in the pictures, which was evident in her lower energy and reduced initiative in sustaining conversation. The family member commented that she thought her grandmother was falling asleep during the visit. When asked whether she wanted to stop the pictures, the resident replied that she wanted to continue. The family member noted that it seemed she said this to be polite.

Overall, the granddaughter and the resident exchanged frequent eye contact, smiles, and conversations about the family. While she showed little delay in pointing and calling out names of her family members, she consistently confused her daughter for herself or even her granddaughter. While the resident was accurate and quick to point out herself in the pictures, she often confused pictures of her daughter as herself. One of the pictures of the resident's daughter and granddaughter in the room seemed to confuse her the most. The resident pointed to the screen, "Is this you?" The granddaughter replied, "No, that's V [her mother]." Pointing to the girl next to the mother the granddaughter noted, "This one's me." The resident then once again pointed to the same woman she identified first and asked, "And who is this girl?" To which the granddaughter sweetly repeated, "V, my mom." The grandmother then shifted her finger back to the little girl and replied, "And this is a little V." The granddaughter replied, "Yes. It looks like her." The granddaughter later commented that her grandmother's recollection of names were accurate only half the time, a decreased shift in the level of success compared to the prior visit with the photo album.

One of the challenges of using the digital picture frame was that due to the large file size of the images, it took several seconds for the picture to load onto the screen. There were silent lulls during the transition as they both stared at the screen, waiting for the picture to clear up. While the resident showed no delay in pointing and calling out names of people in the picture, the family member was the initiator in introducing the picture to her grandmother. This role seemed reversed compared to the visit with the album where the primary initiator in talking about the picture was the resident.

### 3.6.2 Comparison Across Visits Per Design Concept

#### Body Positioning & Visual Connection

Visit A:



Illustration 3.60: Visual connection between the resident and family member (Video Footage, A, Family E)

The granddaughter and resident were positioned slightly angled but directly across from each other. Despite the distance between the two individuals, they were able to maintain good eye contact for most of the visit. Occasionally, the granddaughter leaned forward towards her grandmother and held her position as she listened to her stories.



Visit B:



Illustration 3.61: Perpendicular body positioning to view material and make eye contact (Video Footage, B, Family E)

At the start of the visit, the family member placed her grandmother's wheelchair angled and across from her. When she proceeded to share the album with her grandmother, she adjusted herself towards the edge of her seat and pulled her grandmother's wheelchair closer to her. This enabled them to place the album on their laps to view the photographs together. They looked up at each other when asking questions or confirming statements. The distance between the two individuals was shortened significantly compared to when they sat across from each other.

Visit C:



Illustration 3.62: Visual connection between the resident and family member (Video Footage, C. Family E)

While the family member was able to sit in the center of the conversation booth as designed, the resident was not transferrable and was wheeled in as close to the booth possible. The width of the booth seat and adjacent panel was not wide enough to fit the wheelchair. As the two individuals were angled towards each other, they were able to make frequent eye contact throughout the visit. The digital picture frame was pulled close to them and was viewable at a near side-by-side position.

## Enabling Touch

Visit A:



Illustration 3.63: Touch exchange between the resident and family member (Video Footage, A. Family E)

While there were not a lot of exchanges of touch, the granddaughter leaned forward to touch her grandmother's hand to make comments about her ring and hold her hand briefly. The resident commented about the warmth of her granddaughter's hand that prompted more exchange of conversation. The positioning of the family member's chair and wheelchair made it a challenge to continue or prolong the connection and exchange of touch.

Visit B:



Illustration 3.64: Touch exchange between the resident and family member (Video Footage, B, Family E)

There were few instances where touch was exchanged. The granddaughter extended her arm to hold her grandmother's arm briefly as they exchanged a smile. After they finished looking at the photo album, the granddaughter put it aside and leaned forward to touch her grandmother's hand for a moment as she examined a colored mark left from a prior craft activity. The wheelchair and balancing of the book between the two individuals limited the exchange of touch and physical affection.



Visit C:



Illustration 3.65: Limited touch exchange between the resident and family member (Video Footage, C, Family E)

The only occurrence of touch in this visit was when the granddaughter pulled her grandmother's hand back from touching the screen. As they were not sitting next to each other on the booth, the booth and wheelchair were barriers to enabling touch.

The family member commented later in her interview that although she acknowledges the warmth and pleasantries exchanged through touch, she and her grandmother are not very "touchy-feely" type individuals.

## Eliminating Distraction

Visit A:



Illustration 3.66: Momentarily distracted by people and objects in the room (Video Footage, A. Family E)

The resident was minimally distracted or bothered by any of the disruptive visual or auditory activities in the area. The resident did not notice the loud banging of keys on a piano until the family member brought it up. The granddaughter asked, “I think they’re tuning the piano. What do you think?” The resident responded, “Oh, that’s what somebody is doing?” She then nodded and chuckled. While the two were able to continue their visit despite the disruptive noises, they both used it to strike up conversation. When there was a silent lull between conversation topics, the resident shifted her gaze down to her hands or a tissue she was holding. However, as soon as her granddaughter spoke again, she resumed eye contact. She did not have any difficulty regaining her focus on her granddaughter and what she was talking about.

Visit B:



Illustration 3.67: Momentarily distracted by people in the room during a conversation lull (Video Footage, B. Family E)

On several occasions, the overhead intercom came on with loud messages. It seemingly had no affect on the visiting family member or resident. The resident momentarily looked away during a brief lull in the conversation but regained focus as soon as the granddaughter spoke. The presence of researchers or camera also went unnoticed.

Visit C:



Illustration 3.68: Momentarily distracted by people in the room (Video Footage, C. Family E)

The resident was considerably more distracted in this visit compared to the other two visits. Movement and activities going on across the room in the cafeteria easily drew her attention away. On several occasions, she looked away while waiting for the picture to load on the screen. The family member commented that her grandmother that afternoon was tired and wasn't really there for the visit.



## Providing Focus

Visit A:



Illustration 3.69: Resident pointing to objects and making eye contact to capture attention (Video Footage, A. Family E)

The resident was deliberate in her actions to capture her granddaughter's attention by pointing or physically raising her arm for focus. For example, when talking about her ring or watch, the resident raised her hand and arm towards her granddaughter as she spoke about them. As the two were positioned directly across from each other, their main focus remained on each other.

Visit B:



Illustration 3.70: Family member and resident drawing attention on an image (Video Footage, B. Family E)

The resident commanded focus as she placed her hand on the album scanning each picture, pointing and calling people out by name. As the album was balanced flat on their legs, both the resident and her granddaughter placed their hand on the spread, looked down and focused each other's attention by pointing. The album and pictures kept the resident focused and provided topics for conversation. The resident focused on details of the pictures. For instance, she compared one picture to another, commenting that she and her sister look alike. She also pointed out facial expression

an indication of emotional state. Looking at a picture of her great-granddaughter holding a viola the resident replied, “She looks like she’s going to cry!” They both chuckled as they talked about the young girl’s experience playing the viola and how she later quit. “Oh no!” said the resident.

An observation of interest is that although the resident viewed the spread from left to right, based on her placement of her fingers, the pictures she commented about were not necessarily from top to bottom. This indicates that perhaps some pictures may have been more recognizable and/or interesting than others on a spread.

Visit C:



Illustration 3.71: Family member and resident pointing and swiveling the frame to focus attention on image details (Video Footage, C. Family E)

The angled side-by-side positioning of their bodies and leveled line of sight enabled the resident and her granddaughter to turn easily towards each other and view the screen together. They both used the carved handles of the stand to rest their hand in between raising them to point to people and objects in the picture. In one instance as the resident was asking a question about the picture, she swiveled the frame towards her granddaughter for a closer look.

## **Supporting Accessibility**

### **Visit A:**

The resident was positioned across the visitor seat and remained in her wheelchair for the duration of the visit. There was ample room around the visit chairs to allow movement and flexible and safe placement of the wheelchair.

### **Visit B:**

The resident remained in her wheelchair while the granddaughter sat in an armchair perpendicular to her. The photo album was primarily balanced on the lap of the resident, forcing her to twist her body and lean over the book for a closer look. It also limited any movement the resident might have made to adjust her legs or body.

### **Visit C:**

The resident was not transferrable and remained in the wheelchair positioned outside of the booth. The family member commented that the primary challenge of working with the booth was its inability to support wheelchair accessibility. The opening of the seat and side panel was not wide enough to accommodate the width of the wheelchair.

### 3.6.3 Additional Insights

#### Crowding of the Feet

Visit A:



Illustration 3.72: Crowding of the feet due to wheelchair foot stand (Video Footage, A. Family E)

The resident was wheeled and positioned across from the visiting granddaughter. Although the physical distance of face-to-face connection was considerably far, the positioning of the wheelchair created crowding of feet below the seat. On several occasions, the family member shifted her body to get comfortable. She carefully moved her legs so that they would cross over her grandmother's feet without causing any accidental collision.



Visit B:



Illustration 3.73: Crowding of the feet due to wheelchair foot stand (Video Footage, B. Family E)

The resident's extended legs due to the wheelchair caused crowding in the feet area.

The family member shifted a number of times to carefully move her legs over her grandmother's. It was only after they had finished looking at the photo album that the family member was able to again carefully uncross her legs and sit back in the armed chair comfortably.

Visit C:



Illustration 3.74: Limited crowding of the feet (Video Footage, C. Family E)

There was little crowding of the feet as the resident remained in her wheelchair outside of the booth and the frame was positioned to the side of the wheelchair. Although the family member had to sit close to the edge of her seat and lean forward, it left some room between the base of the stand, the wheelchair, and her legs.

### **Enabling Control**

Visit B:

The photo album was a familiar medium for both the resident and the family member to manipulate. While the granddaughter was mostly responsible of flipping the pages, the resident held the book on her lap and occasionally lifted the page to take a closer look. Her hands were placed on the book and she moved her fingers across the spread to point out details in the picture and identify people.



### **Intuitive Electronics to Facilitate Control**

#### **Visit C:**

The family member commented that the digital picture stand was easy to use, particularly with only two buttons to control the viewing. While the resident was active in swiveling the frame and resting her hand on the stand, the family member was in control of changing the pictures and pulling the stand towards them.

### **Emotional Connection & Perceived Quality of Visit**

#### **Visit A:**

The resident and her granddaughter exchanged emotions and sentiments that were appropriate to the context of the conversation. For instance, the resident commented that the tip of her nose was always very cold. The granddaughter replied that dogs' noses are always cold. They both chuckled sweetly together. What began as a comment about the cold spring weather that day transpired to talking about gardening and what they did with the produce such as pickling and freezing. The resident was able to contribute and show her knowledge of this activity through small comments about how frozen tomatoes could be used easily for lots of things. When the resident did not understand what her granddaughter had made with her frozen tomatoes, she asked, "Excuse me, you made what with them?" While strong emotions and some meaningful memories such as who the granddaughter married and details about the wedding could not be recalled, the warm exchange between the resident and her granddaughter positively contributed to the perceived quality of the visit.

#### **Visit B:**

While it was emotionally disturbing for the resident to not recognize pictures of her daughter and mother of the visiting granddaughter, the visit was perceived to be

meaningful and compared to be better than most other visits. As they looked through the album, the resident smiled at pictures her granddaughter pointed out. They made brief comments about their family members and memorable traits. Despite not accurately identifying every family member, the resident was engaged, listened intently when her granddaughter spoke and made good eye contact. Having topics of conversation fueled the flow of exchange between the two individuals. The granddaughter expressed her happiness to be able to keep her grandmother focused and to have meaningful things to talk about together.

#### Visit C:

The resident was not as alert and interested in this visit. She however was still very responsive to her granddaughter when asked questions, or pointed out a new picture. The resident either called out people's names or asked who it was. What is interesting to note is the repeated difficulty the resident has in remembering her daughter, the mother of the visiting granddaughter. The granddaughter commented that it is possible that the resident is challenged to remember people she has not seen in the past 20 or so years. She also commented that it is unclear whether or not her grandmother recognizes who she is despite her continuous visits. Their prolonged exchanges and visual connection make it rewarding and meaningful to the family member. The granddaughter commented that visits were much longer with the use of the photographs than when she visits without any props. In particular, what keeps the conversation continuous is the resident taking initiative to ask questions to fuel an exchange.

### **3.7 Staff Interviews**

Upon completion of the family visits, interviews were held with six members of Beechtree Care Center's staff, including the CEO/Administrator, to gather their perspectives and feedback on the study and its components. One of the administrative staff, the Director of Development and Admissions, was familiar with the Family Visit Program from a previous exploratory study that was conducted in Longview Care Center in 2008. She provided her candid thoughts and reactions to the changes made in this study particularly around the design of the conversation booth and setting.

While staff members were not direct participants of the family visits, they validated the personalities and cognitive and physical state of each resident. One of their observations is that despite their challenged cognition and reality orientation, each resident was emotionally responsive. When visiting with family, they may not recognize names or relationships, however sense an emotional connection and closeness that allows them to put their guard down.

Overall, staff participants expressed strong interest and agreement with the study treatments and felt the design details and intent were generally supportive of the functional needs of their residents and staff. Their impressions of the study primarily focused on the design and use of the conversation booth. While they generally accepted the functional benefits of the booth design such as the acoustics, visual privacy, ergonomic comfort, and transfer support, they were divided in the aesthetic appeal of the design. With an organizational objective to achieve Person-Centered care, Beechtree promotes creating a home-like environment. As such, they did not feel the booth design fit into their vision of familiarity, warmth, and hominess.

Several staff members commented that the unit was not inviting and unless there were significant benefits of conversing in it compared to an adjacent sofa, they would not be inclined to use it. Some of their specific recommendations for improvement included different choice of wood paneling, neutral yet more pleasing upholstery, and lowering of the panel height. The staff member who was familiar with the previous booth design commented that the lowering of the panels and removal of the canopy were helpful in better blending into the family room setting.

One of the major disadvantages of the booth design was identified as the inability to be inclusive of wheelchairs. A staff member noted that the residents that participated in the study were the “elite” of residents that are able to maintain upright posture without assistance. Many of the residents in the center are not easily transferrable and require upper back and neck support. If the booth is unable to provide this, it should accommodate the wheelchairs that do.

Feedback around the digital display medium were mixed. Some staff members felt the scrapbook and ability to provide tactile stimulation in addition to visual was important for the resident to build an emotional connection with the item. Others however, felt that the added benefit of enlarging the image better supported residents with diminished vision and helped with recognition and recall. They also commented that although the digital display is perceived as foreign, it might also be reminiscent of a television screen that is familiar. The adjustability, size and design of the digital stand were accepted as functionally effective and aesthetically pleasing. Beechtree Care Center, passionate about caring for the elderly, gave full support for the exploration of alternative visit settings, support that was vital to this study.

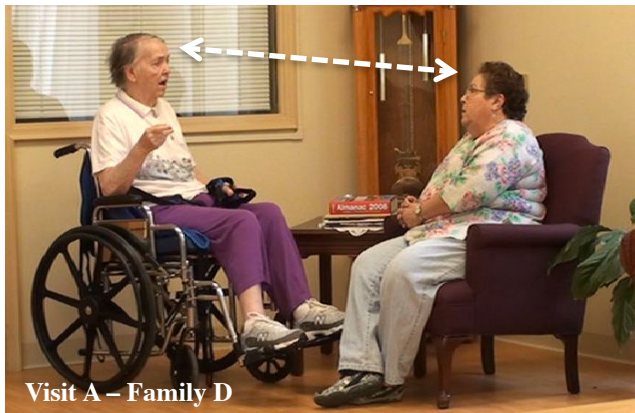
### 3.8 Summary of Findings

The Family Visit Program was designed to better understand how the environment and provision of meaningful sensory stimulation impacts the quality and experience for families visiting with residents with dementia and Alzheimer’s Disease. The study involved two primary interventions—environment and sensory stimulation—and two associated treatments for each. Each visit and treatment was evaluated on the effectiveness of five design components: body positioning and providing visual connection, enabling touch, eliminating distractions, providing focus, and supporting accessibility. What became evident through the observations were additional factors that impact the functionality of the treatments, comfort of the participants, and perceived quality of the visits. The following further illustrates a summary of findings across family visits.

		Design Concepts				
		Body Positioning and Visual Connection	Enable touch	Eliminate Distraction	Provide Focus	Support Accessibility
Environment	Pre-arranged Furniture	Allows better face-to-face connection.	Physical barrier that limits ease of touch.	No visual privacy.	Enables better focus for face-to-face interaction without use of photographs.	Flexible accommodation for wheelchair users who are not transferable.
	Conversation Booth	Allows closer conversation distance and side-by-side connection.	Eliminates physical barrier to allow ease of touch.	Provides visual privacy from sides and back.	Enables better focus for viewing photographs together.	Lacks accommodation of wheelchair users who are not transferable.
Sensory Stimulation	Book-style Photo Album	N/A	Interacting with and holding the book limit ease of touch.	Horizontal placement provides no block to the front. No peripheral block.	No focus. Numerous images at a time.	No limitations. Placement on lap or held in arms.
	Digital Picture Frame	N/A	Reduces burden of holding or focusing to allow ease of touch.	Size and vertical placement reduces distractions in front. No peripheral block.	Allows focus on one image at a time.	5-star base interferes with wheelchair. Limited movement to bring it closer to user.

Figure 3.2: Overview: Design concepts related to the study environment and sensory stimulation

## Body Positioning & Visual Connection



Face-to-face positioning allowed direct visual connection but with significant distance between the family member and the resident.



Side-by-side positioning enabled close physical connection. The height of the wheelchair required the family member to raise the book and look up at the resident.



Side-by-side positioning with reduced barriers enabled closer visual and physical connection between the family member and resident. The height of the wheelchair required the resident to look down and family member to raise her gaze.

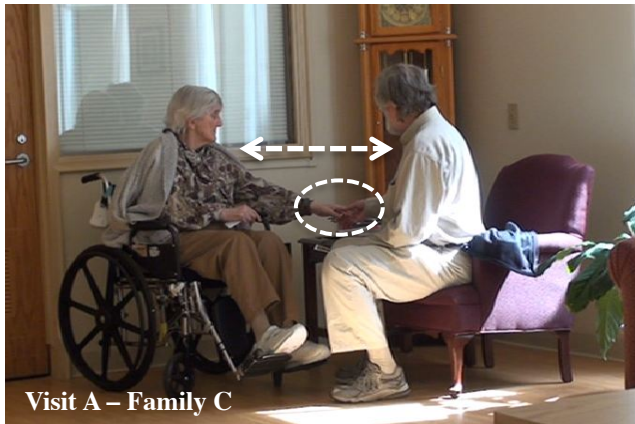
Illustration 3.75: Overview: Visual connection between the resident and family member

Visits across all families were consistent with the intended treatment outcome and affect on visual connectivity. While the environmental setting of Visit A, enabled direct face-to-face connection, Visits B and C allowed a closer conversation distance through side-by-side connection and reduced physical barriers between the family

member and the resident. Even still, the arm and side of the lounge chair and footrest of the wheelchair limited mobility and direct physical connection.

With the exception of Family B, all of the residents were reliant on wheelchairs. The size and height of the wheelchair varied and affected ease of visual connection as the participants were required to alter their gaze up or down to maintain direct line of sight. The size and shape of the wheelchair also impacted the placement and movement of legs. While this was not an issue when sitting directly side-by-side as pictured in Illustration 3.75 of Visit B for Family D, there was significant crowding when angled towards each other in Visit C or face-to-face in Visit A. The height difference of the wheelchair required family members to adjust their body often in uncomfortable positions for long durations of the visit. For instance, family members often sat at the edge of their seat leaning intensely forward to make eye contact or share an image with their resident. They used the arm of the wheelchair to balance their weight as they held up the photo album. Once the wheelchair was locked in place, it was difficult to move the resident while seated and as such, it required the family members to shift and move.

## Enabling Touch



The physical distance between the family member and resident limited frequency and duration of touch exchange.



Interacting with the photographs and holding the book limited the ability to exchange touch.



Side-by-side seating and eliminating the burden of holding the viewing medium enabled exchange of touch and physical affection.

Illustration 3.76: Overview: Enabling touch between the resident and family member

Application and use of touch is highly personal and varies based on individual comfort and preferences. While some family members indicated that they are not the “touchy feely” type, they recognized the effectiveness of providing touch to their relative as a



way to communicate affection, connect emotionally, and in a practical sense, a way to draw attention. For family members who frequently provide touch in forms of giving hugs, putting their arm around their shoulders or holding hands, they continued to do so despite the environment or set up. For example, family member A sat at the edge of her seat, balancing her weight even as her feet were tucked underneath her father's wheelchair to stay physically close to hold his hand and allow him to touch her face and hair. In this instance, she electively removed the physical barrier of distance to enable touch exchange.

In addition to personal preference and level of comfort, barriers to enabling touch exchange included physical distance, objects and structures in between individuals, and occupied arms. Able-bodied family members more often initiated touch exchange. When they were required to hold and control the photo album, they were limited in their ability to provide touch during the visit. When the resident was able to control the viewing of the photo album, this allowed family members to swing their arm over the resident and point along. Across all families, the most touch exchange was observed in Visit C. For residents who were transferred onto the conversation booth, family members were able to sit right up against them. At minimum, they were able to sit shoulder-to-shoulder or knee-to-knee. By removing the burden of holding the photographs, the family members were able to use their arms to provide touch throughout the visit even if on occasion to bring attention back on the activity.

## Eliminating Distraction



The resident was easily distracted by reflective objects, noise, and movement. Her gaze shifted from one object to another while the family member tried to sustain a conversation.



When prompted, the resident returned her gaze down on the photographs. However, without any physical barriers, the resident was easily distracted by objects in her periphery.



Sitting outside of the conversation booth, the resident's attention was easily drawn away by movement and noise. The family member used verbal prompts and touch to bring the residents attention back on the visit.

Illustration 3.77: Overview: Eliminating distraction

Environmental distractions were observed to most significantly impact residents with late stages of dementia. In this study, Family D was the only group to experience the detrimental challenges of distraction and over-stimulation, which resulted in aggressive behaviors post-visit including hitting and biting of the family member. As

pictured in Illustration 3.77, noise, reflective surfaces, and movement in and around the area easily distracted resident D. Her gaze shifted from one object and person to another during each visit. The visits for Family D were overall shorter than all the other families with an average of 13-minutes compared to the averages of 29 to 36 minutes for the other four families. In addition to environmental distractions, the viewing of the photographs became a source of over-stimulation for the resident. While some images elicited immediate smiles and chuckles directed at her daughter, others seemingly brought about confusion and sadness particularly around images of her late husband. She began to complain of pain and expressed desire to end the visit. What this may indicate is sensory over stimulation of emotions both good and bad in addition to visual and auditory distractions in her periphery.

For the other groups, distraction became more of an issue and challenge for the family members rather than the residents. Although residents were observed to occasionally look away momentarily when they heard loud noises or saw people entering the room, they returned their gaze on the activity and their family member. For most of the visits, there were loud noises in the adjacent hallway, disruptive overhead speaker announcements, and movement of people and large objects. During a visit with Family E, a piano was being tuned for the entire duration in the cafeteria across the hall. It was the family member who finally used this as a point of conversation. The resident seemingly did not take notice until her granddaughter brought it up. Family members recognized that decline in vision and hearing may contribute to less awareness of the distractions. However, everyone indicated that the family room was peaceful in comparison to the chaotic environment on the resident floors above.

## Providing Focus



Face-to-face interaction and maintaining direct line of sight enabled the resident and family member to focus on each other and the conversation.



The photo album served as a focal point and catalyst for conversation. With multiple images on a spread, the resident and family member used their fingers to draw attention to people and details they wanted to talk about. The side-by-side positioning supported ease of viewing together.



With a single, enlarged photograph displayed on the screen, the resident and family member were able to talk about details of people and objects together. It eliminated competing points of focus and different sequence of viewing.

Illustration 3.78: Overview: Providing Focus

The ability to focus attention on the conversation is an essential component of the Family Visit Program as it affects the quality of connection and exchange. The combination of treatments was intended for exploring the affect of visual privacy,

body position, and shared activity on levels of focus and engagement. What was evident about the environment of Visit A across all families is the enablement of focus on each other by being face-to-face and in direct line of sight. In Visits B and C, the side-by-side body position with a viewing medium in front allowed the primary focus to be on the photographs. Although the intent of the booth design was to provide some level of peripheral visual privacy, the effectiveness was limited as the source of most distractions were auditory from sources directly ahead and unshielded by the side panels of the booth. With the exception of Resident D, all of the residents were able to maintain focus on their family and activity for the duration of the visits. Family members also used tactics such as shifting to be in the resident's direct line of sight, using hand gestures, and physical touch as ways to draw attention and focus.

The photographs in Visits B and C served as a catalyst for conversation and focus. The way in which the conversation was facilitated in these visits was slightly different across visits. For Visits B, viewing occurred at varying speeds and sequences, due to multiple photographs on a page. On occasion, the resident's subject of focus was not necessarily the family member's image. As a result, there were instances when the resident's attention was pulled away by the family member's commentary. When the book was balanced on the resident's lap, both the resident and family member were able to use their fingers to move along the page together, reviewing and making commentary about the same picture in the sequence and at the speed the resident set. For Visits C, the digital display forced focus on one image at a time allowing both viewers to point and make comments on the same picture. Although the family member controlled advancing the pictures, the resident verbally confirmed when to make the switch. By eliminating competing visuals and enabling the resident to control the speed of viewing, families were able to maintain a high level of focus.



## Supporting Accessibility



The lounge chair was removed so that the resident's wheelchair could be positioned in its place. The family member was able to adjust her position to maintain close proximity to her father.



With the assistance from a staff member, the resident was carefully transferred to the conversation booth. As the resident was fully dependent on transfer support, he did not use the arm rests.



Two of the five residents were non-transferrable and remained in their wheelchairs for all visits. The conversation booth did not accommodate wheelchairs and required residents to sit outside of the booth. The 5-star base digital screen interfered with the wheelchair and was pulled to the side of the resident in order to bring it closer.

Illustration 3.79: Overview: Supporting Accessibility

Support for accessibility was evaluated on the effectiveness of accommodating the resident's level of mobility, hearing, and sight. Visits A and B allowed for flexible arrangement of seating units to accommodate wheelchairs. With the exception of

Family B, all of the residents were escorted into the family room in their own wheelchairs. Visit C, required participants to sit in the designated booth. As two of the residents were non-transferrable, they remained in their wheelchair for the duration of the visit. The booth did not accommodate wheelchairs and as a result, these two residents sat outside of the booth. This eliminated most all intended benefits of the booth setting for these families.

Both the photo album and digital display enabled ease of use and control. The book's size and weight allowed most of the residents to hold and control the book whether on their laps or in their arms. Family D was the only instance when the family member was fully responsible to support and raise the book up to the resident. The digital display as a separate unit freed the families from having to hold the book. One of the challenges with the display however was the interference of the 5-star mobile base and the wheelchair. The base limited movement and ability to bring the screen closer to the resident for viewing. One of benefits of the digital display that was identified by the Family C family member was his observation that the enlarged images helped the resident's compromised vision. She was able to recognize more people in a larger photograph compared to the same photograph in its original paper form.

Although some level of hearing deficit is experienced by most of the residents, this did not adversely impact ability to communicate. Residents self reported in their interviews that they did not have any difficulty hearing their family member. There was minimal delay in providing a response when asked a question. Family members also reported that hearing deficits in residents were not an issue particularly because of the relatively quiet environment the family room provided.

## Additional Insights

### Crowding of the Feet



The perpendicular seating position resulted in crowding around the feet. The family member sat at the edge of the chair with feet tucked underneath the resident's foot rest to sit up close. After several minutes, the family member stretched out her leg from under the foot rest and kept this position for the remainder of the visit.



The wheelchair was a physical barrier, limiting proximity, connectedness, and comfort for the family member.



The base of the digital picture frame limited mobility of the resident as well as the ability to pull the screen closer.



The resident's wheelchair caused crowding around the feet and limited mobility of the family member sitting across. The family member carefully adjusted her position as not to cause any harm during her movement.

Illustration 3.80: Overview: Crowding of the Feet

Crowding around the feet was a consistent issue across all families visiting with residents in wheelchairs and while using the digital display in Visit C. The length of



a typical wheelchair is 42 inches measured from the back of the rear wheels to the front of the footrests. An additional 6 inches is then accounted for foot space as the footrest only supports the heel. As such, a resident's foot extended approximately 16 to 22 inches from the edge of the seat. A family member sitting on a lounge chair typically used 12 to 18 inches of foot space from the edge of the seat. When the families sat face-to-face or angled towards each other, the result was crowding around the feet. Given that the resident's feet were elevated by the footrest, the family members often tucked their feet under the footrest to sit closer to the resident. What was evident was the discomfort family members experienced as they carefully shifted their bodies and stretched their legs from underneath the footrest. The only occasion when crowding did not occur was when Family D pulled the chairs side-by-side to view the photo album during Visit B.

The base of the digital display did not effectively support mobile accessibility. When the device was pulled up close to the viewers, it in effect locked legs in place. Family members were observed to stretch out their legs by carefully shifting their legs over and outside of the mobile base. The base of the display also interfered with the wheelchair, limiting its movement and placement for the resident.

## Enabling Control



The resident immediately picked up the book, crossed his legs, adjusted his glasses, and began flipping through the album.



The resident controlled the speed of viewing and drove the conversation with her selection of images and commentary.



The resident settled into a familiar and comfortable behavior of sitting back in her chair with her legs crossed, holding the book in her arm. She occasionally offered the book to her son to look at a particular image.

Illustration 3.81: Overview: Enabling Control

With continued cognitive and physical decline, residents lose the ability to live autonomously. A degree of control and ownership are important attributes to quality of life and engagement. The sensory activity of viewing meaningful photographs was

intended to serve as a catalyst for conversation and connection, as well as a way to provide residents a sense of familiarity and control. The study treatments were reviewed based on the ability for residents to control and drive certain elements of the visit such as the speed in which they viewed images, selection of images to focus and talk about, and ability to manipulate the viewing medium.

What became evident from Visit B was the sense of familiarity that residents exhibited when presented the photo album. With the exception of resident D, all of the residents took the book in their arm or lap, sat back in their chairs, and began flipping through the pages. Settling into this position and behavior despite the residents' limited physical and cognitive abilities indicated a level of comfort and familiarity of the object and activity. With the exception of the family member helping to separate some of the vinyl pages or leaning over to point at an image, the resident was mostly in control of the viewing. Overall, the person in control of the book was the dominant driver of conversation by initiating questions, comments, and stories based on the photographs. For residents with limited verbal abilities, they more often responded to family members' questions and comments with short phrases or smiles.

For Visit C, most of the families exhibited shared ownership and control of the activity. Although the family members used the remote control on the stand to advance images, they more often did so only after they received direction from the resident that she or he was ready to move on. In comparison to holding the photo album, the viewing activity became slightly more passive for the residents. They sat back in the booth occasionally leaning in to focus or to point at details on the display. They used the handles on the display surface to swivel the screen towards their family

member. The shared control over the activity facilitated ease of focus and allowed participants to move through the activity together.

### **Intuitive Electronics to Facilitate Control**

This particular observation addressed the effectiveness of the remote control and digital display unit used in Visit C. Overall, family members reported ease of use as the remote simply allowed them to move backwards and forwards. They also commented on the intuitive placement of the wooden handles that family members along with the residents were able to use to swivel the display and pull it closer for viewing. Some of the challenges of the technology included malfunctioning of the image control and loading speed. During Family A's visit with the device, the images were stuck in a slideshow mode and advanced quicker than desired. When the resident was beginning to process the image, the display quickly changed to the next. The disruption was frustrating for the family member and as a result, impacted the quality of the visit. The other challenge with the device was around image loading speed. This was particularly a frustration for Family C that had asked to upload 63 images. Depending on the file size of the scanned photograph, the images were slow to clear up on the screen. The resident expressed her light frustration at the device saying, "C'mon, c'mon" motioning the image to clear up.

### **Emotional Connection and Perceived Quality of Visit**

Measuring the quality of visits was entirely subjective and based on perceived reciprocation of responses and sentiments. The amount of exchange between the resident and family member significantly varied based on the resident's verbal and cognitive abilities. For visits with residents struggling to engage in conversation, the family members found emotional connection to be a major reason for visit satisfaction.

Looks of endearment, touch, and responses appropriate in context provided a sense of connection and satisfaction. Families with a resident who was verbally communicative, were generally content with being able to have an engaged conversation and exchange despite partial accuracy of the resident's recall. However, the resident's inability to recall meaningful memories or significant people inevitably left family members disheartened.

It is worth noting that recognizing and accepting the cognitive and physical state of the resident may have allowed family members to cope and re-calibrate their relative measure of meaning and quality of visits. For instance, Family D hoped for greater responsiveness and focus from her mother. The resident's inability to recognize her daughter or emotionally laden memories caused strain on the family member. However, the brief connections and exchange of sentiments and words in Visits B and C seemingly made a significant difference on the satisfaction of the family member. The family member described that her mother's level of engagement moved her especially when pictures of her and her mother elicited positive emotions.

Positive emotional responses despite limited verbal abilities provided family members a sense of connectedness, helping to make visits meaningful and personal. In the case of Family A, although the resident was unable to recall his daughter's name, his awareness and reciprocation of affection and enjoyment of her company were major contributors to the perceived quality of visits. For Family C, seeing the resident's enthusiasm, approval, and interest in the photographs allowed lightness to the visit and exchange of commentary regarding people and places in the images.

Visual connection and ability to maintain the resident's interest and focus also contributed to the perceived quality of visits. Similar to Family B and C, Family E noted that despite the resident's inability to accurately recall details, she was engaged, listened intently, and made good eye contact. Having access to many topics of conversation fueled the flow of exchange. The granddaughter expressed her happiness to be able to keep her grandmother focused and to have meaningful things to talk about together.

The Family Visit Program at Beechtree Care Center allowed the opportunity not only to make one-time observations of behaviors and interactions, but also to better understand the context and relative meaning of these occurrences. Developing a narrative around emotional and physical conditions of the resident and capturing the nuances of their relationship with the family member and their life history were imperative in the study task of gathering relevant insights about meaning and influence. The intent of the pictorial organization of evidence was to illustrate and compare findings across visits rather than across families. Each family, their relationship, and residents' stage of cognition were unique. As a result, the focus was to review the affect of the treatment on each family separately and then to evaluate based on commonalities and differences among visits.

## **CHAPTER 4**

### **DISCUSSION**

#### **4.1 Development of the Study**

As the intent of the study was exploratory in nature, the findings do not provide conclusive evidence of a singular hypothesis. Instead, the study identifies a breadth of insights of how dementia and Alzheimer's affect the ability to connect and communicate with loved ones and inform opportunities to enable rewarding and therapeutic visits. This iterative research process and review of the Family Visit Program specifically looked to evaluate how the design of the environment and sensory stimulating activity affect the quality of visits in care facilities.

##### **4.1.1 Resident Experience of Interaction**

The development of the Family Visit Program is based on a premise that emotionally laden sensory stimulation in combination with a supportive physical environment can enable improved communication and exchange between family members and residents with dementia and Alzheimer's Disease. Recognizing the diminished physical and cognitive abilities of residents, the program intent was to design a supportive environment and programmed activity to facilitate focus, engagement, and emotional connection.

Family photographs that represented pieces of the resident's life story served as the primary source of sensory stimulation. They targeted long-term memories that remain in tact longer with disease progression. The photographs served as a catalyst for

conversation, enabling the families to interact in the moment rather than rely on short-term memory and recall to sustain exchange. A key to enabling exchange was the ability to engage in the resident's sense of reality, despite their frequent loss of reality orientation.

Overall, the residents that participated in the study expressed their enjoyment of visits with their family. When presented the photographs, residents were quick to take interest. It is unclear whether they responded more favorably to the scrapbook or the digital display, as they seemed to not question the use of the different mediums. Regardless of the viewing medium, what they saw seemingly registered to them simply as a picture. While some of the photographs elicited stronger responses than others, a common reaction was to smile. There was evidence of frequent spikes in interest as residents exclaimed recognition and identification of people and places. Although the accuracy of recall was somewhat difficult for some residents, their level of self-awareness was frequently evident. Residents were able to identify themselves, making observations on what they were wearing or whom they were with. It was clear that some images were emotionally charged as they brought out tears, particularly if the individual in the image had passed. Childhood pictures of the visiting family member and the resident brought out endearment as the two reflected on passing of time and joyful memories together. These moments of emotional connection and reciprocation of endearment elevated quality visits and satisfaction with the interaction. Although there was evidence that most visits were perceived as a positive experience for residents, there was lack of evidence of lasting effect, that the positive feelings created for residents during visits lasted for any duration once the visits concluded.



#### **4.1.2 Family Experience of Interaction**

Families with loved ones in decline experience a tremendous amount of emotional hardship and have difficulty finding ways to support and connect with their loved one. As such, the Family Visit Program aimed to support not only the needs of the residents but also provide resources targeted to support visiting family members. Some of the intended outcomes for family members in particular were that they would be equipped with a better understanding of their loved one's abilities, gain a sense of comfort with communication tactics and resources, and alleviate some of the burden of being the primary driver of engagement during visits. The desired outcome was also to enable the family member to walk away with a rewarding and meaningful visit in order to encourage continued visits and enhanced connection with the resident. Provision of a sensory stimulating activity and catalyst for conversation was intended to avert distress for family members that otherwise could occur in their attempts to carry on normal conversation when the resident, due to her or his decline in short term memory, was repetitive or could not comprehend conversation flow.

As family members begin to recognize and accept the physical and cognitive state of their loved ones, they seemingly shift their expectations of visits and how they measure quality of the visit. In interviewing each family and what the experience of the disease or condition has been like for them, they shared that over time, they relinquish and reset their expectations. They learned to lower their threshold of frustration and be slow to correct and push for accuracy of detail, even at the cost of disheartenment. It is important to balance acceptance of deteriorating conditions with the empowered belief that their visits are making a difference. Not doing so could

potentially lead to a sense of helplessness and inability to recognize the value that their efforts create.

Family members with residents further along in disease progression begin to base satisfaction of a visit not on the level of engagement, but on emotional exchange. Engagement and exchange are differentiated in this study particularly as a way to evaluate cognitive and physical ability and quality of visits. Engagement indicates an ability to sustain a conversation and to reciprocate multiple responses related to one or related topics. Exchange on the other hand is an abbreviated connection and is based on a singular response to a stimulus. In the case of many of the residents who have diminished verbal abilities, their responses of “yes” or “no”, facial expressions, or gestures such as pointing were accounted as a successful instance of exchange. The quality of exchange was based on the relevance of the response to the context of the stimulus.

Quality of a visit was also defined by the ability to spend time with a loved one and sense mutual enjoyment of each other’s company. Although not all residents were able to recognize who the visitor was all of the time, they sensed that they liked the individual and that they enjoyed spending time with them. For family members, even just the recognition of their presence and enjoyment were satisfying. For example, the daughter of Family B stated that although it is hard when her mother doesn’t remember her father, the time they are able to share and connect in some form is good enough for them. For Family A, even though her father is not verbally expressive, he is still communicative. Although he confused his daughter for someone else, there is mutual appreciation of each other, adding to a sense of delight and endearment.

## **4.2 Evaluation of Intervention Components**

There were two primary interventions that were used in combination – one that adjusted the environmental setting and another that applied sensory stimulation. Each intervention had two corresponding treatments or variations. Treatment 1 was paired with Treatment 3 and Treatment 2 was paired with Treatment 4. In future studies, it would be beneficial to also observe the alternate combination of Treatments 1 and 4 and 2 and 3 as well as using them independently. The logic and rationale for focusing on the treatment combinations used in this study was that the first, Visit A, measured a baseline. Another, Visit B, reviewed a familiar setting and form of activity. The third, Visit C, reviewed a foreign setting and form of activity.

### **4.2.1 Treatment 1: Arrangement of Furniture On-site**

The purpose of using this arrangement of furniture on-site was to examine the affect of a conventional environmental setting, relative to that of the conversation booth on engagement and interaction between family and residents. It mimicked as generically as possible, a typical visit between a resident and family member. What this does not represent are the numerous visits that are held on the resident floors and in resident rooms. Even still, it captured a sense of how the interaction occurs and it gauged the level of engagement and exchange that are typically present in a visit. Families in their post-visit interviews stated that Visit A was comparable or better than most visits, because these visits did not occur on the resident floors.

The setting employed for Visit A exposed study participants to distractions. The furniture placement in the corner of the family room exposed family members and residents to all of the activity and noise directly ahead. As the entrance to the room was along a major thoroughfare of the first floor common area, there was constant

movement and activity during the visits. Even with these distractions, the setting employed in the study in contrast to family visits that occur on the resident floors was far less chaotic.

Although the setting was set up with two lounge chairs perpendicular to each other in the corner, the family members were allowed to remove one of the chairs in order to wheel their family member to their usual position. The setting did not dictate the angle at which they placed their resident relative to where the family member would be seated. It was interesting to observe that while some of the families placed the wheelchair fairly perpendicular to their seat, others placed the wheelchair directly across or slightly angled. Placement of the wheelchair directly across or more angled towards the family member reduced some of the visual distractions in the hallway directly ahead. One of the challenges of this particular set up was the placement in the room. The placement was dictated by where the conversation booth could be situated so that the orientation could be mirrored across both environmental treatments. There was a supply closet in the room that was accessed regularly, requiring the seating unit not interfere with path of traffic. The booth could also not cover up the window wall. The other wall was a small kitchenette that also could not be restricted. As such, the constraints of the room dictated the placement of the conversation booth and the lounge chair set up.

Face-to-face positioning was optimal for focusing the resident's attention on the family member and making eye contact. The major disadvantage however was the conversation distance. Face-to-face positioning resulted in a four feet spacing between participants, minimum. This distance served as a barrier limiting touch exchange. This distance also interfered when engaging in an activity together such as

viewing a single scrapbook together. The angle of viewing was sub-optimal for the family member.

Also challenging was the height difference of the wheelchair and the lounge chair. Depending on the size of the wheelchair, the participants were required to adjust their gaze. In the case of Family D, the daughter had to raise her head significantly to make eye contact with her mother. While this is doable with residents who are able to hold themselves upright and still have the mobility to move their upper body and head, it would not work if the resident was stationary and had limited control of her or his body. When considering visit settings, there should be ways to ensure direct eye level connection and reasonable conversation distances between families and residents.

The primary benefit of this setting in comparison to the conversation booth is that it was more inclusive and flexible to accommodate wheelchairs and users of varying mobile capabilities.

#### **4.2.2 Treatment 2: Conversation Booth**

The majority of concerns and criticisms of the booth design were around aesthetics and inclusion. From a functional standpoint, family members and staff reported agreement with most of the design features and purposes for them. The primary concern was around whether the design was inclusive in support of a greater population of residents. For instance, people who are unable to hold their upper body and neck upright would not be able to sit in the booth. Staff members expressed that the residents that piloted this booth were considered the “elite” of the residents with higher mobility and bodily control capabilities. A consideration could be that if by making the design overly inclusive, it becomes unusable or less inviting. Further

determination should be made regarding whether the booth should be designed for universal use or targeted for a certain level of functionality, albeit non-inclusive. The use of the booth by residents that required significant transfer support may not necessarily be effective. Such a design potentially could place more physical burden on staff members or create safety risk for residents.

From a functional standpoint, the armrests and vertical dowels were not utilized. Only one family used the armrest for a short portion of time. It was hidden and as such was out of sight and out of mind. The wooden dowels on the sides although added an aesthetic detail, was designed to allow people to grab and hold for a sense of security and support. These were not utilized as residents who did sit in the booth sat in the middle seat. The functional benefits of these supports were not realized or noticed and the components seemed ancillary.

The perception of the booth being comfortable was highly subjective and dependent on user preferences. Some people found the firm support to be helpful and comfortable. Others complained that sitting in it for long periods of time was uncomfortable, noting that they could eventually feel the wooden seat boards beneath the seat cushions.

An intent of the design was to enable people to sit next to each other undeterred by physical barriers. Understandably, people have different tolerances and preference for touch and personal space. Absence of barriers gave families the choice to self determine where and how they sat and provided them control relative to their preference of touch and space. While the design accommodated exchange through

touch, the idea was more to remove the barrier for touch exchange to occur if people elected to do so.

While the booth provided visual privacy from activity occurring to the back and sides, it did not provide any shield from distractions directly ahead. Additionally, the placement of the unit did not provide any privacy or protection from the majority of activities in direct line of sight. As such, from a visual privacy standpoint, the effectiveness of the booth design could not be measured.

Evaluation of aesthetics is highly subjective. However, most of the feedback that was provided was around how the booth design compares and relates to the surrounding environment. First impressions came across that the design seemed visually foreign and institutional. It did not evoke a sense of hominess that the rest of the setting strived to achieve.

#### **4.2.3 Treatment 3: Book-style Photo Album**

It was evident that the album provided a sense of oldness and familiarity as most of the residents immediately took to it and settled into a comfortable behavior of reviewing the book. It was fascinating to observe this happen even for residents with diminished physical and verbal responsiveness. Images that captured familiar poses and behaviors by residents, despite their limited ability to express so, were visual reminder of the presence of individuals and their personalities.

There were a number of functional considerations that were derived from the use of the photo album. One was the glare the vinyl cover created under certain angles of light. This glare made some of the images difficult to see. Minimizing glare and

reflective surfaces are important attributes. One of the test elements of this prop is that it contained multiple photographs and sources of stimulation. It was unclear how this affected residents. The only visible occurrence of this being suboptimal is when it was evident that the resident and family member were viewing at different speeds and thinking about different images. For residents who are not as verbal, the family member felt inclined to fill in the silences by asking questions or pointing people out. This at times pulled away the resident's attention. Having one enlarged picture on a spread perhaps could better focus attention while still providing the benefit of clarity and familiarity.

The weight and size of the book enabled the resident to hold it in their arm or lap. It also enabled them to control it to some extent. When the book was balanced on the resident's lap, it required them to adjust their upper body or neck to look down at a severe angle. Not all residents are physically able to do this. The ability to bring something up to their direct line of sight is ideal.

#### **4.2.4 Treatment 4: Digital Picture Frame & Stand**

Of the two relatively foreign concepts introduced in the Family Visit Program, the digital display was the best received. Family members and staff confirmed the ease of use, pleasant aesthetics, and functional benefits of flexibility, adjustability, and size. The ability to pull up and enlarge pictures one at a time and in direct line of sight of the resident made it easier to see and talk about images. While there was some concern that the digital picture frame was unfamiliar and perhaps not as effective as the scrapbook, some family members and staff commented that it likely was reminiscent of a television screen with which most residents are familiar. One family member commented that there is merit in exploring technological interventions, giving



the example that her father, despite his diminished physical and cognitive abilities, was able to manipulate pictures on her touch screen smart phone.

Although families understood that the display was highly adjustable, the height of the display was never changed for the visits across families. The display was also kept at one viewing angle. The only adjustable features that were utilized were the rolling base to pull the device closer along and the handles to swivel the display side to side. These observations raise the question of whether the adjustable components have limited value or if the families simply did not find them intuitive to use during a visit session.

The rolling five-star base was slightly problematic as it caused crowding around the feet. It also limited being able to pull the stand closer when feet or wheelchair footrests were in the path of the rolling base. The base also locked legs in place when pulled up close, impacting the level of comfort of participants. When shifting their legs over and out of the trap, family members were intentionally careful as not to kick the device over.

Today, technology and variety of options exist to reconcile some of the challenges families experienced in this study such as speed of image loading and mechanisms being stuck on a particular viewing mode. For studies in the future, there should be consideration to explore the use of touch screen tablets that can seamlessly display pictures as well as video. As the model in this study was an older technology, participants experienced longer than desired lag time between images and pixilation of pictures. It was evident that the length of time it took some pictures to clear up was

frustrating for most people, including residents. The lull also opened up windows of vulnerability to distractions.

Another key learning was that the number of photographs to use in one session should be controlled. Family C requested the use of 63 images. Although the resident enjoyed them, it was evident that this number of images caused fatigue.

Also worth exploring in future studies is the impact of using older photographs compared to newer ones. As long-term memory remains intact far longer than short-term memory, it may be possible that older images are more effective relative to recall abilities. However, another factor to recall and stimulation could be around the level of emotional charge an image contains. It would be of interest to explore whether newer photographs that are seemingly emotionally laden elicit a strong response from residents.

Overall, while the scrapbook provided a greater sense of familiarity and added the element of tactile stimulation, the digital medium was functionally more supportive of varying physical needs. The digital medium also enabled a synchronized activity between family members and residents.

#### **4.3 Limitations and Considerations for Future Research**

As an exploratory study, it resulted in a number of implications and considerations to further develop the Family Visit Program components.

#### **4.3.1 Sample Size, Setting, and Participants**

While the intent of this study was not to test hypotheses, the study would have benefited from greater sample size of participants and quantity of visits. Some of the factors that could be further explored include comparing impact of the Family Visit Program on residents with varying levels of cognition beyond the mild to moderate stages and participants residing in different care facilities to assess variation of environmental settings. Additionally, the treatment components could have been used in alternate combinations or independently to further assess their impact.

As a study of human behavior and interaction, complexity and nuance are realities that should be captured in detail. They provide the ability to drive impactful change and awareness by making issues evident and relevant. Greater sample size and variation of settings may further broaden insights that compare and contrast key issues and outcomes. However, it is imperative to maintain a balance of quantitative data collection and analytics with the richness of qualitative complexities that effectively illustrate the true narrative of a person's experience and quality of visits.

#### **4.3.2 Data Collection**

Additional resources for data collection and alternative methods of soliciting direct feedback from participants would have increased consistency of evaluation across families.

##### **4.3.2.1 Video Recordings**

A limitation of conducting the observations was having a single camera pointed in one direction. What this did not allow was observation from the vantage point of the participants, particularly around what images they were looking at and discussing.

The ability to match what they were seeing and what their reactions were would have helped define effectiveness of stimuli. Additionally, having back up equipment is deemed imperative. In one of the visits, the wireless microphone malfunctioned and as a result, a small portion of a visit was captured in video without corresponding audio.

#### **4.3.2.2 Interviews**

Interviews with family members immediately after each visit were effective in gathering direct feedback around how they felt, and how they perceived the quality of the visit in comparison to other visits. Context such as accuracy of memory recall were attributes only verifiable by the family member. For instance, one of the residents was highly communicative with seemingly vivid memories. Upon discussions with the family member after the visit, it was confirmed that much of the stories were fabricated and that her mother's sense of reality orientation was entirely off. One of the biggest challenges of reliance on interviews for participant feedback was gathering clear reactions from the residents. Not all residents were verbally communicative. Particularly for these individuals, alternative methods to gauge their level of interest through non-verbal indicators of expressing satisfaction should be explored.

#### **4.3.2.3 Researcher Field Notes**

As an exploratory study, the researchers first noted and observed everything that occurred and later categorized findings. It would have been beneficial to have more structure and direction as to what to observe and focus on. Field observation notes were qualitative and subjective based on researcher perception. The only quantitative

yet subjective evaluation was determination of level of engagement of the resident and family member.

#### **4.3.3 Data Analysis**

The primary analysis of this exploratory study was the triangulation of the interviews, videos, and researcher field notes. The focus was less on quantitative occurrences of behaviors but rather a broad observation of qualities and attributes that influence it.

##### **4.3.3.1 Challenges of Evaluation Method**

All of the families were at different stages of cognitive and physical decline. As such, it was difficult to distinguish and attribute how the various treatment components affected each resident based on their stages. While the issue of consistent evaluation is complex in nature, there are others that are seemingly simple to pursue. One in particular is the ability to track what stimulus triggers what response. The single camera view captured responses without always being able to track what triggered them.

Although the primary intent of the photographs was to serve as a tool for communication and connection rather than accuracy of recall, it would be interesting to use recall as a measurement of cognition and reserve, particularly if it were to vary over time or across settings.

The rating system for perceived quality of visits is a challenge to use as a consistent comparison across families. It is subjective relative to individual family members' understanding and acceptance of the state of their residents' decline. One

consideration is to outline a list of descriptive criteria of baseline levels of satisfaction, engagement, and exchange.

#### 4.4 Looking Towards the Future

##### 4.4.1 Design Recommendations for Conversation Booth and Digital Display

The conversation booth and digital display were designed and built as prototypes to provide an optimal visit setting and supportive device for sensory stimulation while supporting the physical sensitivities of people with Alzheimer's Disease and dementia. Observations of the visits along with interviews generated feedback and evaluation of the designed components. While much of the feedback relative to the seating unit was around improvements to aesthetics, the feedback about the digital display centered more on functionality.

##### Conversation Booth

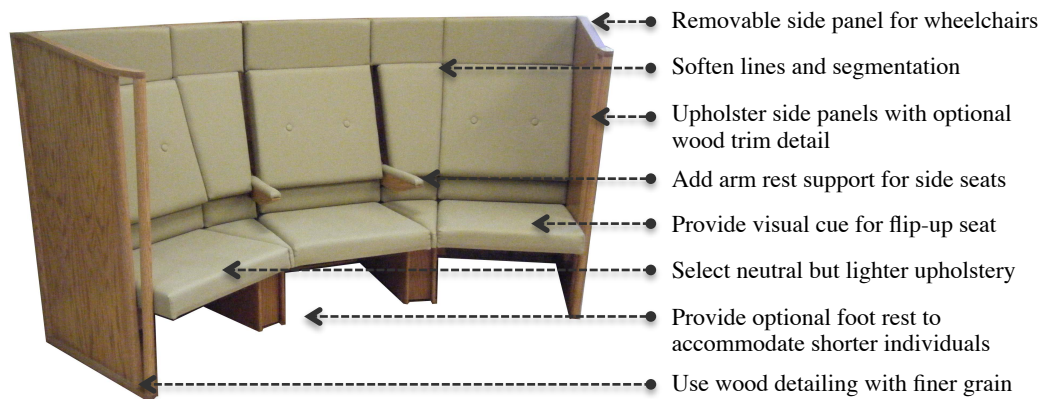


Illustration 4.1: Design recommendations for the conversation booth

Further refinement to the booth design should consider functional improvements as well as the look and feel and its ability to blend into the built environment. While functionally it provided a sense of coziness and comfort, it appeared foreign and

industrial. The greatest challenge was the inability to accommodate wheelchairs. One way to enable more inclusive design is to allow removable side panels for the wheelchair to be placed at the end of the unit. Although the flip-up seats and armrests were specifically designed to provide additional support for residents getting in and out of the booth, these components were not utilized. Without actively prompting use, visual cues that elevate the user's intuition in control of the designs may promote greater use of features. Although the booth was designed around the ergonomics of an elderly woman, the design may benefit from an optional footrest to accommodate smaller individuals.

### Digital Display

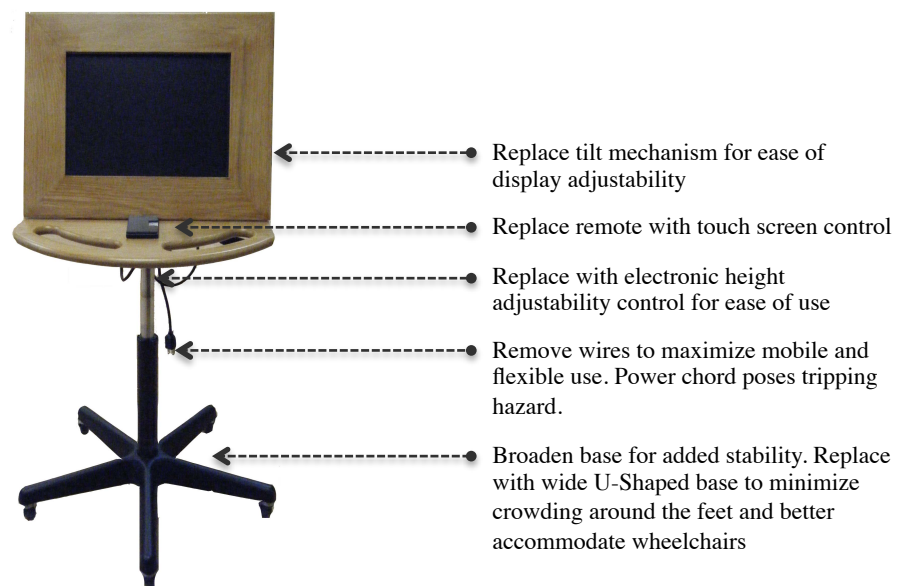


Illustration 4.2: Design recommendations for the digital display

The concept of a digital display of enlarged photographs was well received by all participants of the study. Refinements for future use are namely around further simplification for intuitive use and adjustability. With the prevalence of touch screen technology for media viewing, the replacement of a digital picture frame with a tablet

device may further support ease of use. The two components that were particularly challenging were the five-star base and the reliance of a long wire for power. Broadening of the wheeled base and replacement with a U-Shaped structure may help to minimize crowding around the feet as well as interference with wheelchairs. Replacement of the viewing device with one that eliminates the necessity for wires and chords during use will reduce any tripping hazards when plugged into a power source as well as untether the unit for flexible use.

#### **4.4.2 Application of Booth Concepts and Digital Display in Interactive Settings**

The concept of a furniture-based solution to provide a level of focus, privacy, and intimacy are reflected in a number of highly popularized products in the market today. The adoption of these units is increasingly widespread in commercial environments, particularly within open work settings. In an environment that is kept open to maximize natural light and foster ease of connectivity and collaboration, it is important to provide a variety of settings to support the diverse nature of how people work and interact. As such, creating visual and functional variety within the open workspace is important. These booth units are often used in combination with digital display for shared viewing as well as surfaces to enable work and interaction. The success of these units to create a microenvironment within a larger space enables flexible use. The high-back design and upholstered surfaces provide acoustic properties to contain some level of conversation as well as peripheral visual privacy. Although costly, the perceived level of privacy and sense of intimacy make these units coveted and well utilized.

The following products are examples that share similar functional attributes as the conversation booth while offering some ideas for design refinement.





Curved modular lounge seating centered around a media display. Optional canopy provides visual privacy and a level of acoustic support.

**Steelcase**  
media:scape lounge



Evoking similar aesthetics of a traditional wingback chair, the lateral headrests provide visual shielding and focus.

**bene**  
PARCS Wing Sofa

Illustration 4.3: Contract furniture designed for interaction and retreat: Steelcase and bene

Modularity and ability to use these products in multiple configurations allow flexible use. The curved setting allows ease of focus of users and on shared activities or conversations. Particularly for the bene PARCS Wing Series, the design mimics a familiar silhouette of a traditional wingback chair. The extended headrests provide effective visual shields and focus on what is ahead.



With 30°, 45°, 90° modular units, various configurations can be created. The high upholstered back provides visual screening and limited acoustic support for containing conversations.

**DAVIS**  
Radius Meeting



Illustration 4.4: Contract furniture designed for interaction and retreat: DAVIS

The Radius Meeting lounge unit from Davis is a good example of visual continuity and clean lines. The rounded edges and continuous upholstery provide softness to the look and feel. The vertical lines created when joining units is simple and minimal, avoiding disruption to the soft aesthetic.



With modern aesthetics, this high-back sofa provides an alcove space for focus, retreat, and conversation. The placement of units effectively creates a room within a room, providing high degree of visual and acoustic privacy.

**vitra**  
Alcove



Illustration 4.5: Contract furniture designed for interaction and retreat: vitra

Another highly popularized product, the vitra Alcove provides an intimate setting for conversation and retreat. The cushioned upholstery is effective in containing some level of noise as well as providing visual shielding. The soft yet modern aesthetics allows what otherwise is a square and foreign shape to feel inviting and comfortable. While certainly, this unit does not provide the support required for aging individuals, the visual aesthetic could be mirrored in the booth design.

#### **4.4.3 Creating Effective Destinations for Family Visits in Care Facilities**

One of the particular insights from this study was that, at minimum, there were benefits realized by conducting visits in the family room and holding visits away from the chaos of resident floors. When families were questioned as to why they do not utilize the visiting room more often, their reasons namely were around convenience.

Most visits occur in common areas in and around resident rooms. This is preferred due to the ease of access to personal belongings as props for conversation. Families commented that it is easier to be near those items than to remove them from the room and transport them elsewhere. More often, family members were willing to sacrifice their comfort to be in a setting that helped them converse with their resident. While most of the residents in this study were in wheelchairs and are fairly easy to transport throughout the building, most family members expressed the preference to stay close to the resident rooms and areas of supervision for convenience and ease of access to staff support.

Enabling opportunities to foster meaningful and enjoyable visits is imperative in care facilities. In addition to creating an inviting aesthetic, incorporating props for conversation, alcoves for spatial and visual privacy, and being mindful of acoustic distractions are important attributes to creating effective destinations for visits. The ability to capture and transport meaningful source of stimuli such as emotionally laden photographs and props for conversation should be thoughtfully accommodated within visit environments.

#### **4.4.4 Continuation of Care Through Staff Involvement**

The use of meaningful objects such as family photographs and props may facilitate building positive relationships between residents, family and care staff. Staff members more often spend the most time with residents in care facilities. The expansion of the Family Visit Program to improve the quality of connection between family members, residents, and staff may further aid in the continuity and quality of communication and care for the resident.

The purpose of this exploratory research was to generate insights to further develop successful pilot studies in the future. The iterative process enabled rapid assessment of attributes that impact quality of visits. The observations and interviews brought light to what features and attributes worked well and what did not that could be altered or further developed. The study of the interrelation of human interaction, cognition, and the environment is complex in nature with great amount of variability. The primary intent of the ongoing efforts to develop the Family Visit Program is to foster a better understanding of this interconnected relationship that people have with the built environment and it's attributes and how this understanding can elevate the perceived value and therapeutic benefits that can be derived from social interactions between people with Alzheimer's or related dementias and those who love and care for them.

## APPENDIX A

Dear \_\_\_\_\_,

We are writing to invite you to participate in a research project related to family visits with residents of Beechtree Care Center. The focus of the research is to work with family members and residents to make visits as rewarding as possible. This work is being done for the Master's Thesis of Hannah Kim, a graduate student in interior design in Cornell University's department of Design & Environmental Analysis. She is working with Professors Eshelman and Becker who are in this department.

The premise of the research is that as residents age and some of their abilities decline, visits between family members and their loved ones can become somewhat frustrating. Memory declines, attention span may shorten, and communication may not flow as easily. This study explores the effect of the design of the space where families interact with their loved one, and the use of meaningful images to help provide a positive focus for the visits. The Family Visit Program began in 2008 as an exploratory study at Longview here in Ithaca. Results of the first study showed several benefits such as creating a more comfortable environment and improving visual and acoustical qualities to enhance social interaction.

The Family Visit Program in which we are inviting you to participate involves the following steps. The first step involves Hannah Kim working with you to select positive family images from your own collection of photos, slides, etc. Once the images are selected, they can be used by the residents and family member(s) in sitting together and talking and reminiscing about the photos and the memories they may trigger. The second step involves three family visits under several different environmental settings. With your permission, Hannah will be nearby during the visit to get a sense of how the setting and use of images affect interaction. After the visits, she will meet with you to get your impressions of the visits through a brief interview session.

We are contacting you now inviting you to participate in this study. We believe the results of the study can help us and other facilities like ours as we continue to think about how we can provide the most rewarding and positive visit experience possible. Please let Administrator, Patrick Weir at (607)273-4166 know if you are interested in participating. If you respond favorably, Ms. Kim will be in contact with you in the coming weeks to answer any questions you may have, and to see whether you would like to be involved. Thank you very much.

Sincerely,

Patrick M. Weir  
CEO, Administrator

## **Cornell Research Project – Family Visit Program Orientation Process & Exit Interview Process**

**Conversation with family before initial meeting with them.** This will be done with a letter and phone call. The following will be presented and discussed with the family

- What sources of family images do you have (albums, slides, etc.)?
- Think about the significance of images to resident so as to select images that will elicit a positive reaction.
- Think about the resident's life as a story and identify chapters that you feel are significant for the resident (from the resident's childhood and early life, from more recent years including children and/or grandchildren, etc.).  
Consideration should be taken when selecting old images depending on how familiar you are with the images and your ability to talk about them.
- Try to select at least 30 images and bring them to/have them ready for the session meeting.

**Preparation with family.** This session can take place either at the family's home or at (name of site), depending on factors such as family's preference, location, comfort level, etc. At this meeting, the following things will be done. At least two members of the research team will be present at this session (one to do the scanning, and one to discuss communication strategies with the family).

- Images will be scanned and loaded. Although this will take more time than if the images were handed off to the research team and then scanned elsewhere and returned to the family, this method may make the family more comfortable as they will not have to hand over their family images.

**Rehearsal with family.** This session will occur at (name of site), on the day of the visit. The following things will be done at this session to introduce and familiarize the family with the setting in which the visit will take place. (The order in which visits A, B, and C occur will be randomized for each family.)

### **Visit A: Pre-arranged seating using existing furniture**

- Review general conversation strategies as noted in handout A (attached)

### **Visit B: Pre-arranged seating to view a family photo album together**

- Review general conversation strategies as noted in handout B (attached)

### **Visit C: Conversation booth and digital picture frame to view family photographs together**

- Review general conversation strategies as noted in handout C (attached)
- We will run through operating the digital picture frame and stand in the conversation booth with the family.
- We will identify features and ergonomic qualities of the conversation corner to the family.

**Exit interview process.** This session will occur at (name of site), after the last visit. The following things will be done at this session.

- Conduct the final interview
- We will provide a reference handout with conversation strategies they can use for future visits. (Handout D is attached)
- Families will receive a CD with a digitized copy of their family photographs that were used in the visits.



## **APPENDIX B**

### **Cornell Research Project – Family Visit Program Communication Strategies—Handout A**

- First and foremost the visit should be fun for everyone.
- Let the conversation flow without feeling the need to correct the resident about facts. The positive energy of the interaction is more important than the factual accuracy. To avoid emphasis on accuracy, try to connect the conversation to the resident's world rather than to your reality.
- Recognizing that the resident's short-term memory may be declining, be conscious of the resident's ability to keep up with the conversation.
- Feel free to engage the resident through touch as well as sight and sound. A hand stroking an arm or a hug can sometimes say more than words. Try to read how the resident feels about this. If she or he doesn't seem to want to be touched at the moment, there is no need to push it.

If you have any questions or would like clarification or further explanation about any of these ideas, feel free to ask now, or contact Hannah Kim at [hk335@cornell.edu](mailto:hk335@cornell.edu) or 502-550-9741.

**Cornell Research Project – Family Visit Program**  
**Communication Strategies—Handout B**

- First and foremost the visit should be fun for everyone.
- Focus on emotions more so than facts in the course of talking about images. Try asking the person in the photograph appears happy.
- Let the conversation flow without feeling the need to correct the resident about facts. The positive energy of the interaction is more important than the factual accuracy. To avoid emphasis on accuracy, try to connect the conversation to the resident's world rather than to your reality.
- Recognizing that the resident's short term memory may be declining, be conscious of the resident's ability to keep up with the conversation. In instances where conversation enters a lull because it seems that you are relying on short-term memory of what was just said, try to return the focus of the conversation to the image.
- To reduce reliance on short-term memory and capitalize on the resident's remaining long-term memory, try to keep conversation focused on the image. Having the stimulus there and visible eliminates the need to rely on short-term memory as a means of interaction. The underlying idea is to distinguish between short-term and long-term memory.
- If you sense that the resident is becoming agitated, ask the resident what is bothering her or him and then move on if something in the image is the source of negative reaction.
- If an image doesn't seem to spur conversation, it can be just as fun to look at the image and make up a story rather than trying to connect the image with factual memories.
- Don't get hung up on getting through all the images. Allow a reasonable amount of time for the resident to process the image and conversation, and move on to another image when it appears that conversation related to an image has lulled.
- Feel free to engage the resident through touch as well as sight and sound. A hand stroking an arm or a hug can sometimes say more than words. Try to read how the resident feels about this. If she or he doesn't seem to want to be touched at the moment, there is no need to push it.

If you have any questions or would like clarification or further explanation about any of these ideas, feel free to ask now, or contact Hannah Kim at [hk335@cornell.edu](mailto:hk335@cornell.edu) or 502-550-9741.

**Cornell Research Project – Family Visit Program**  
**Communication Strategies—Handout C**

- First and foremost the visit should be fun for everyone.
- Focus on emotions more so than facts in the course of talking about images. Try asking the person in the photograph appears happy.
- Let the conversation flow without feeling the need to correct the resident about facts. The positive energy of the interaction is more important than the factual accuracy. To avoid emphasis on accuracy, try to connect the conversation to the resident's world rather than to your reality.
- Recognizing that the resident's short term memory may be declining, be conscious of the resident's ability to keep up with the conversation. In instances where conversation enters a lull because it seems that you are relying on short-term memory of what was just said, try to return the focus of the conversation to the image.
- To reduce reliance on short-term memory and capitalize on the resident's remaining long-term memory, try to keep conversation focused on the image. Having the stimulus there and visible eliminates the need to rely on short-term memory as a means of interaction. The underlying idea is to distinguish between short-term and long-term memory.
- If you sense that the resident is becoming agitated, ask the resident what is bothering her or him and then move on if something in the image is the source of negative reaction.
- If an image doesn't seem to spur conversation, it can be just as fun to look at the image and make up a story rather than trying to connect the image with factual memories.
- Don't get hung up on getting through all the images. Allow a reasonable amount of time for the resident to process the image and conversation, and move on to another image when it appears that conversation related to an image has lulled.
- Feel free to engage the resident through touch as well as sight and sound. A hand stroking an arm or a hug can sometimes say more than words. Try to read how the resident feels about this. If she or he doesn't seem to want to be touched at the moment, there is no need to push it.

If you have any questions or would like clarification or further explanation about any of these ideas, feel free to ask now, or contact Hannah Kim at [hk335@cornell.edu](mailto:hk335@cornell.edu) or 502-550-9741.

**Cornell Research Project – Family Visit Program**  
**Communication Strategies—Handout D**

- First and foremost the visit should be fun for everyone.
- Focus on emotions more so than facts in the course of talking about images. Try asking the person in the photograph appears happy.
- Let the conversation flow without feeling the need to correct the resident about facts. The positive energy of the interaction is more important than the factual accuracy. To avoid emphasis on accuracy, try to connect the conversation to the resident's world rather than to your reality.
- Recognizing that the resident's short-term memory may be declining, be conscious of the resident's ability to keep up with the conversation. In instances where conversation enters a lull because it seems that you are relying on short-term memory of what was just said, try to return the focus of the conversation to the image.
- To reduce reliance on short-term memory and capitalize on the resident's remaining long-term memory, try to keep conversation focused on the image. Having the stimulus there and visible eliminates the need to rely on short-term memory as a means of interaction. The underlying idea is to distinguish between short-term and long-term memory.
- Keep in mind the idea that decline in short-term memory lends itself to the notion of interacting in the moment.
- If you sense that the resident is becoming agitated, ask the resident what is bothering her or him and then move on if something in the image is the source of negative reaction.
- If an image doesn't seem to spur conversation, it can be just as fun to look at the image and make up a story rather than trying to connect the image with factual memories.
- Don't get hung up on getting through all the images. Allow a reasonable amount of time for the resident to process the image and conversation, and move on to another image when it appears that conversation related to an image has lulled.
- Feel free to engage the resident through touch as well as sight and sound. A hand stroking an arm or a hug can sometimes say more than words. Try to read how the resident feels about this. If she or he doesn't seem to want to be touched at the moment, there is no need to push it.
- Be aware of things that may be potentially distracting: sound, sight

If you have any questions or would like clarification or further explanation about any of these ideas, feel free to ask now, or contact Hannah Kim at [hk335@cornell.edu](mailto:hk335@cornell.edu) or 502-550-9741.

- Additional references about communication strategies and visits in general include the following:
  - Talking to Alzheimer's by Claudia J. Strauss (New Harbinger Publications, 2001)
  - Learning to Speak Alzheimer's by Joanne Koenig Coste (A Mariner Book, Houghton Mifflin Company, 2003)

## APPENDIX C

**Family Visitation Form**  
**Facility: Beechtree Care Center**  
**Researcher Name:**

---

Resident Project ID #: \_\_\_\_\_

Visit Code: \_\_\_\_\_

Date of Visit: \_\_\_\_\_

Time of Day: \_\_\_\_\_

List of family member(s) visiting: \_\_\_\_\_

---

**Level of Interaction of the resident:**

1	2	3	4	5	6	7	8	9	10
Little Interaction				Average			A lot of Interaction		

**Level of Interaction of the family members:**

1	2	3	4	5	6	7	8	9	10
Little Interaction				Average			A lot of Interaction		

---

\*\*\*Note: Definitions for scoring level of interaction.

*Little Interaction:*

- Resident is in his or her own world; does not initiate any conversation; minimal nodding and smiling.
- Family member does not initiate much conversation; minimal efforts to engage residents.

*Average Interaction:*

- Resident acknowledges visitor, takes part in conversation.
- Family member takes part in the conversation but there are intermittent pauses and break in flow of conversation.

*A lot of Interaction:*

- Resident initiates most of the conversation and is dominant in the conversation.
- Family initiates most of the conversation and is dominant in the conversation.

## **APPENDIX D**

### **Interviews with Residents:**

The following questions will be asked to residents participating in the Family Visit Program immediately following a visit (A,B,C).

#### **Visit A: Pre-arranged seating using existing furniture in the facility**

Did you enjoy your visit with your family member(s)?

Did anything in the living room distract you during the visit?

Did you have any difficulty hearing or understanding your family member(s) during your conversations?

#### **Visit B: Pre-arranged seating to view a family photo album together**

Did you enjoy your visit with your family member(s)?

Did you enjoy looking at images in the photo album?

Did anything in the living room distract you during the visit?

Did you have any difficulty hearing or understanding your family member(s) during your conversations?

#### **Visit C: Conversation booth and digital picture frame to view family photographs together**

Did you enjoy the visit you had with your family in the conversation booth?

Did you find it cozy?

Is the conversation booth comfortable to sit in?

Does the conversation booth feel intimate?

Does the design of the conversation booth feel inviting?

Do you like the materials used in the conversation booth?

Were you able to hear what your family members were saying when sitting in the conversation booth?

Did you feel distracted by other things going in the lounge while visiting with your family in the conversation booth?

Did you enjoy looking at images on the digital picture frame?

Was the digital picture frame and stand easy to manipulate?

Would you like to have another visit in the conversation booth looking at images on the digital picture frame?

Other comments:

*We would like to thank you for participating in the Family Visit Program. As you know, the underlying purpose of this study is to learn how to make family visits more rewarding. Your participation has been valuable in this study. If you wish, the findings of the study will be made available to you.*



**Interviews with Family:**

The following questions will be asked to family members immediately following a visit. Questions marked with an (\*) will be asked not in the presence of the resident.

**Visit A: Pre-arranged seating using existing furniture in the facility**

Did you feel that the current conversation setting was cozy and intimate?

Did you experience any difficulty hearing or understanding your family member?

\*On a scale of 1 to 10, how would you rate the quality of your visit? Was it as meaningful and personal as you would like it to have been?

\*How would you compare the quality of this visit to other visits you have had on previous occasions (not in the conversation booth) in terms of your perception of your loved one's (the resident's) experience?

\*Did you notice anything that seemed to distract your family member (noise, visual, etc)?

**Visit B: Pre-arranged seating to view a family photo album together**

Did you feel that the pre-arranged conversation setting was cozy and intimate?

Do you feel that you would want to have another visit in this furniture arrangement? Why or why not?

Did you experience any difficulty hearing or understanding your family member?

Did you enjoy looking at images in the photo album?

\*To what extent did you perceive your loved one enjoying the experience of looking at images in the photo album?

\*Did you find the photo album to be an appropriate medium for looking at images? Why or why not?

\*On a scale of 1 to 10, how would you rate the quality of your visit? Was it as meaningful and personal as you would like it to have been?

\*How would you compare the quality of this visit to other visits you have had on previous occasions in terms of your experience?

\*How would you compare the quality of this visit to other visits you have had on previous occasions in terms of your perception of your loved one's (the resident's) experience?

\*Did you notice anything that seemed to distract your family member (noise, visual, etc)?

**Visit C: Conversation booth and digital picture frame to view family photographs together**

\*On a scale of 1 to 10, how would you rate the quality of your visit? Was it as meaningful and personal as you would like it to have been?

\*How would you compare the quality of this visit to other visits you have had on previous occasions (not in the conversation booth) in terms of your experience?

\*How would you compare the quality of this visit to other visits you have had on previous occasions (not in the conversation booth) in terms of your perception of your loved one's (the resident's) experience?

What were your initial reactions to the conversation booth?

What were your impressions of the conversation booth after sitting in it and experiencing it?

Did the conversation booth feel like a place you wanted to go and sit in for your visit with your loved one (resident)? Why or why not?

Is the conversation booth inviting? Why or why not?

Did you enjoy sitting with your loved one in the conversation booth? Why or why not?

Do you feel that you would want to have another visit in the conversation booth? Why or why not?

Did you find it cozy and intimate? Why or why not?

Is the conversation booth comfortable to sit in? Why or why not?

Are you satisfied with the materials used in the conversation booth? Why or why not?

\*In terms of acoustical qualities in the design of the conversation booth, how well do you feel the conversation booth supported interaction?

\*Did you feel acoustically distracted by other things going on in the lounge during your visit in the conversation booth? Please explain.

\*Did you feel visually distracted by other things going on in the lounge during your visit in the conversation booth? Please explain.

\*Did your loved one seem distracted by other things going on in the lounge during your visit in the conversation booth?

How well did you find the conversation booth to buffer outside distractions?

Do you have any concerns regarding the design of the conversation booth?

If you could change aspects of the design of the conversation booth, what would they be and how would you change them?

\*To what extent did you enjoy looking at images on the digital picture frame with your loved one?

\*To what extent did you perceive your loved one enjoying the experience of looking at images on the digital picture frame?

\*Did you find the digital picture frame to be an appropriate medium for looking at images? Why or why not?

Was the digital picture frame easy to control? Please describe any difficulties experienced.

Was the digital picture frame stand easy to manipulate? Please describe any difficulties experienced.

Was manipulation of the digital picture frame stand intuitive? Please explain.

Do you have any concerns or suggestions for the design of the digital picture frame stand?

Other comments:

**Exit-Interview**

To be conducted after the last visit privately not in the presence of the resident.

How did your participation in the Family Visit Program influence the length of stay during your visit?

How did your participation in the Family Visit Program influence your desire to visit in the future?

What features of the Family Visit Program do you think made the biggest impact on the quality of the visit (conversation booth as a setting, digital picture frame and stand as focal point, pre-arranged furniture setting, photo album)? Please explain why you think this was so.

Have you learned anything from this experience? If so, what have you learned?

Is there anything about the experience you would want to change? If so, please describe.

Other comments:

*We would like to thank you for participating in the Family Visit Program. As you know, the underlying purpose of this study is to learn how to make family visits more rewarding. Your participation has been valuable in this study. If you wish, the findings of the study will be made available to you.*

**Interviews with Staff:**

The following questions will be asked to staff members. The first set of questions (about the conversation corner when not in use for this study) will be asked before any visits have taken place in the conversation corner as part of the Family Visit Program. The other sets of questions (about the conversation booth/digital picture frame stand when in use for this study) will be asked at a point in time following visits that have taken place in the conversation corner as part of this study.

**Prior to visit C: Conversation booth and digital picture frame to view family photographs together**

What were your initial reactions to the conversation booth when it was first placed in the lounge?

Have you sat in the conversation booth?

Did your reactions change after sitting in the conversation booth? Please describe why or why not.

How does the introduction of the conversation booth into the lounge affect the work of staff?

How does the presence of the conversation booth in the lounge affect staff members' interaction with residents?

How did the placement and orientation of the conversation booth influence residents' behavior in and use of the lounge?

Do you have concerns and suggestions for the design of the conversation booth? If so, please describe.

**After Visit C: Conversation booth and digital picture frame to view family photographs together**

Did you happen to observe family visits occurring in the conversation booth as part of the Family Visit Program?

If yes, how did you observe the conversation booth to work as a setting for family visits as part of the Family Visit Program?

If yes, how did you observe the digital picture frame stand to work as a focal point for conversation during family visits as part of the Family Visit Program?

Have you observed any changes in behavior of residents after their participation in the Family Visit Program, which involved use of the conversation booth? If yes, please describe these changes.

Other comments:

*We would like to thank you for participating in the Family Visit Program. As you know, the underlying purpose of this study is to learn how to make family visits more rewarding. Your participation has been valuable in this study. If you wish, the findings of the study will be made available to you.*

## **APPENDIX E**

Family Visit Program  
Beechtree Care Center

### **Research Proposal**

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#### **Premise & Background**

Alzheimer's Disease is a debilitating and progressive brain disorder that causes cognitive decline and eventual loss of the ability to interact and communicate with others. According to numerous studies, family involvement and social interaction have shown to have many therapeutic benefits for people with this disease. However, the decline in cognitive ability and communication skills make it particularly challenging for family members to have fulfilling and engaging visits.

The purpose of the research is to work with family and residents to make visits as rewarding as possible. The program aims to examine supportive and therapeutic design interventions that can be modeled in any home or care facility.

#### **Research Description**

This research involves the assessment of the Family Visit Program, an approach to enhancing the quality of family visits for all involved. Components of the program include: a) a digital picture frame loaded with personally meaningful photographs from family photo albums to function as a source of stimulation for conversation and b) a conversation booth custom designed to focus attention by reducing visual and auditory distractions. A comparison will be made between these components and conventional props for family visits, namely, a book-style photo album and an arrangement of existing furniture.

The study includes three groups of participants: residents, family members, and staff. The program is not exclusive to family members as friends who play a similar role in residents' lives may be just as appropriate for this study. The intent of the study is not to single-out residents who are experiencing progression into dementia. However, in order to learn as much as possible about the affect of the design and therapeutic interventions, the level of dementia has been specified.

There will be a total of three family visits per family.

- A visit will be held using a pre-arranged conversation setting comprised of furniture available in the facility and without a defined source of stimulation.
- A visit will be held using the pre-arranged setting to view family pictures in a photo album.

- A visit will be held in a specially designed conversation booth and will involve using a digital picture frame to view family pictures.

The order in which the three visits occur will be randomized. We will work with families to identify positive images from family photographs and digitize and upload them onto a digital picture frame. Interaction during the visits will be observed and both residents and their families will be asked questions about their experience.

There is no monetary compensation for participating in this study. However, families will receive a digitized copy of their images as well as a communication strategies reference handouts to use for future visits. Results of the study will also be available to all participants at the end of the study.

## **Participant Roles**

### ***Family***

- A friend who plays a similar role may participate as the visitor
- Will be responsible for collecting meaningful photographs to use for the visits.
- Will spend time with residents in a designated conversation setting.
- Will be interviewed following each of the visits.

### ***Resident***

- Will spend time with family visitors in a designated conversation setting.
- Will be interviewed following the visits.

### ***Staff***

- Will be responsible to help identify potential resident participants.
- Will be interviewed following conclusion of all visits to gather any reactions to the study.



## APPENDIX F

### **Cornell Research Project – Family Visit Program Family Consent Form**

You have been invited to participate in a research project related to family visits with residents of Beechtree Care Center. You are being invited because you responded positively to a letter sent to you by Patrick Weir and expressed interest in participating. Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

**Project:** The purpose of the research is to work with family members and residents to make visits as rewarding as possible. Underlying this focus is the observation that as residents age and their abilities decline, visits between residents and their family members frequently become frustrating for both parties. Short-term memory may decline, attention span may become shorter, and communication may not flow as easily as in the past. This study explores the potential of the design of the space where families interact with their loved one and the use of family images to provide a positive focus for more rewarding visits.

**What's Involved:** If you agree to participate, you will be taking part in the Family Visit Program which involves several components. There will be a total of three family visits.

- A visit will be held using a pre-arranged conversation setting using the furniture available in the facility.
- A visit will be held using the pre-arranged setting to view family pictures in a photo album.
- A visit will be held in a specially designed conversation booth and will involve using a digital picture frame to view family pictures.

The order in which the three visits occur will be randomized. We will work with families to identify positive images from family photographs and digitize and upload them onto a digital picture frame. We will also lead families through a short orientation process and introduce how to use the equipment. Interaction during the visits will be observed and both residents and their families will be asked questions about their experience. Staff may also be present or in the vicinity of the conversation booth during the visit and will be asked their impressions of the research project. They have agreed to keep all conversations private.

**Risks & Benefits:** There are no specific risks associated with this research, as the family visits being studied are much like other family visits, differing only in that some of them take place in the specially designed conversation corner and involve looking at pre-selected digitized family images. These visits will be observed and, although some of the conversations may be sensitive, the names and identities of all participants will remain anonymous and confidential.

The underlying benefit to you of participating is the potential for family visits to be more rewarding. Your family will also receive a digitized format of the selected images for personal use. Additionally, your participation in the study will help guide further development of a program that makes family visits for others more rewarding, and that could be implemented in similar facilities.

**Compensation:** There is no monetary compensation for participating in this study, though as previously mentioned, your family will receive a digitized copy of the selected images for personal use.

**Taking part in this research project is completely voluntary.** If you choose to participate, you are free to withdraw at any time, with the choice as to whether any information collected before that point may be used. If you decide not to participate in any phase of the project, this will have no effect whatsoever on your relationship and interaction with the staff and management of Beechtree Care Center. The staff and management of Beechtree know of and support the goals of the study, and understand that participation is completely voluntary.

**All findings reported will remain confidential.** The names and identities of all participants will remain anonymous and confidential in any and all reports, publications, and presentations that may be made of this project, unless signed consent is given. Names will be recorded on interview sheets, for the sole purpose of matching residents with family members. Research records will be kept in a locked file to which only the researcher's have access. All data recorded using a digital camera and/or camcorder, will be destroyed within 10 years. If signed consent is not given, photo and/or video images may only be used with pixilated faces, to prevent identification. As mentioned above, the content of all conversations (as observed or heard by researchers or staff) will be kept private and confidential.

**If you have any questions, please ask them now.** The researchers for this project are Professors Paul Eshelman and Frank Becker and graduate student Hannah Kim, all from Cornell's Department of Design and Environmental Analysis. If you have any questions later, please contact Hannah Kim at [hk335@cornell.edu](mailto:hk335@cornell.edu) or at 502-550-9741. If you have any questions or concerns regarding your rights as a subject in this study,

you may contact the Cornell University Institutional Review Board (IRB) at 607-255-5138 or access their website at <http://www.irb.cornell.edu>.

You will be given a copy of this form to keep for your records. A copy of this consent form will also be kept by the researchers for at least three years beyond the end of the study. For your information, the consent form was approved by the Cornell University IRB on April 2010.

**Statement of Consent:** I have read the above information, and have received answers to any questions I asked. I consent to take part in this research project.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

In addition to agreeing to participate, I also consent to the photographing and/or recording of the family visit.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

I consent to the use of images and/or video clips of me in reports, publications, and/or presentations made of this project.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Cornell Research Project – Family Visit Program  
Resident Consent Form**

We are doing a research project related to family visits with residents of Beechtree Care Center and finding ways to make these visits more enjoyable and rewarding for everyone. We are asking you to help because you are a resident of Beechtree and your family has agreed to participate.

You can ask questions about this research project at any time. If you decide at any time that you don't want to continue, you can ask us to stop.

If you agree to be in our study, you will have three visits with your family. One of the visits will be held using a pre-arranged conversation setting using the furniture available in the facility. Another visit will be held using the pre-arranged setting to view family pictures in a photo album. Another visit will be held in a specially designed conversation booth and will involve using a digital picture frame to view family pictures. The order in which you have these visits will be randomized. After each visit, we will ask you some questions about your experience and feelings.

There is no right or wrong response to the images you will be looking at with your family. You are free to talk about anything that comes to mind. There are also no right or wrong answers to the questions you will be asked after the visits. We are only interested in finding out more about your visit and your feelings about the experience.

If you sign this paper, it means that you have read this and that you agree to be part of this research project. If you do not want to take part in the project, don't sign the paper. Even if you agree now, you can always change your mind later if you decide not to participate. Being part of the project is up to you, and no one will be upset if you don't sign this paper or if you change your mind later.

**Statement of Consent:** I have read the above information, and have received answers to any questions I asked. I consent to take part in this research project.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

In addition to agreeing to participate, I also consent to the photographing and/or recording of the family visit.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

I consent to the use of images and/or video clips of me in reports, publications, and/or presentations made of this project.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## **Cornell Research Project – Family Visit Program Staff Consent Form**

You have been invited to participate in a research project related to family visits with residents of Beechtree Care Center. You are being invited because of your familiarity and relationship with the residents. Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

**Project:** The purpose of the research is to work with family members and residents to make visits as rewarding as possible. Underlying this focus is the observation that as residents age and their abilities decline, visits between residents and their family members frequently become frustrating for both parties. Short-term memory may decline, attention span may become shorter, and communication may not flow as easily as in the past. This study explores the potential of the design of the space where families interact with their loved one and the use of family images to provide a positive focus for more rewarding visits.

**What's Involved:** For your information, the project, entitled the Family Visit Program, involves several components. There will be a total of three family visits.

- A visit will be held using a pre-arranged conversation setting using the furniture available in the facility.
- A visit will be held using the pre-arranged setting to view family pictures in a photo album.
- A visit will be held in a specially designed conversation booth and will involve using a digital picture frame to view family pictures.

The order in which the three visits occur will be randomized. We will work with families to identify positive images from family photographs and digitize and upload them onto a digital picture frame. We will also lead families through a short orientation process and introduce how to use the equipment. Interaction during the visits will be observed and both residents and their families will be asked questions about their experience. Your role in this project is simply to answer questions related to your reactions to the designed pieces used in the study (conversation booth & digital picture frame stand) and of other components of the Family Visit Program. Given that some of the conversations you may hear may be personal and of a sensitive nature, it is important to note that you must agree to keep all conversations private and confidential.

**Risks & Benefits:** There are no specific risks associated with this research, other than those encountered in day-to-day life. Although there may be no direct benefits to you, your participation in the study will help guide further development of a program that makes family visits more rewarding, and that could be implemented in other facilities.

**Compensation:** There is no monetary compensation for participating in this study.

**Taking part in this research project is completely voluntary.** If you choose to participate, you are free to withdraw at any time, with the choice as to whether any information collected before that point may be used. If you decide not to participate in any phase of the project, this will have no effect whatsoever on your relationship and interaction with other staff and management of Beechtree Care Center. The staff and management of Beechtree know of and support the goals of the study, and understand that participation is completely voluntary.

**All findings reported will remain confidential.** The names and identity of all participants will remain anonymous and confidential in any and all reports, publications, and presentations that may be made of this project, unless signed consent is given. Names will not be recorded on interview sheets. Research records will be kept in a locked file to which only the researcher's have access. As mentioned above, for the sake of confidentiality of the study and other participants, it is necessary that all conversations observed or heard be kept private.

**If you have any questions, please ask them now.** The researchers for this project are Professors Paul Eshelman and Frank Becker and graduate student Hannah Kim, all from Cornell's Department of Design and Environmental Analysis. If you have any questions later, please contact Hannah Kim at [hk335@cornell.edu](mailto:hk335@cornell.edu) or at 502-550-9741. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Cornell University Institutional Review Board (IRB) at 607-255-5138 or access their website at <http://www.irb.cornell.edu>.

You will be given a copy of this form to keep for your records. A copy of this consent form will also be kept by the researchers for at least three years beyond the end of the study. For your information, the consent form was approved by the Cornell University IRB on April 2010.

**Statement of Consent:** I have read the above information, and have received answers to any questions I asked. I consent to take part in this research project.

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

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